SAMSUNG

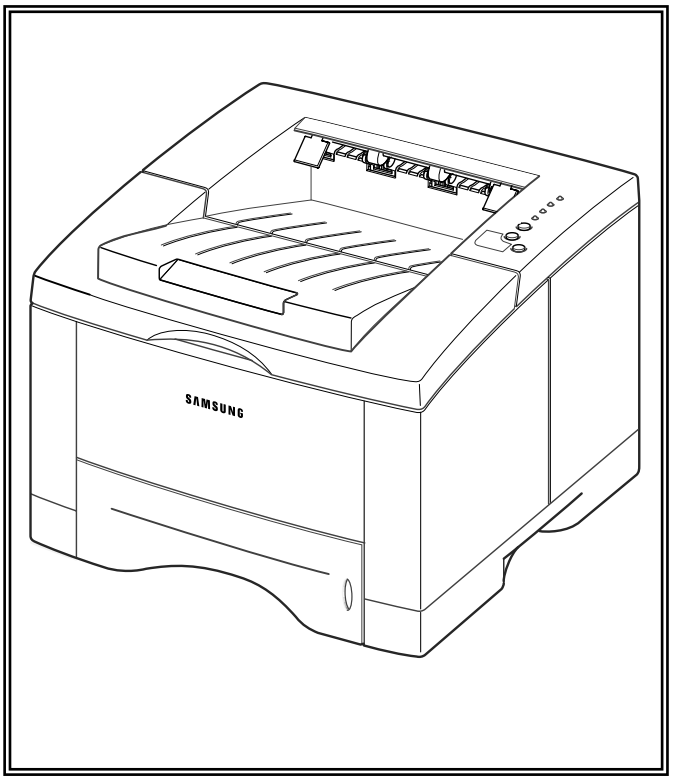
LASER PRINTER

ML-1650Series

ML-1650 / ML-1651N

SERVICE *Manual*

LASER PRINTER



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1. Precautions

Please read the following carefully to prevent any accidents and not to damage the unit during service.

1-1 Safety Precautions

Read each caution carefully:

1. Do not use this printer near water or when exposed to inclement weather.
2. Do not place this printer on an unstable cart, stand or table; the product may fall, causing serious damage to the product.
3. Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation and to protect the printer from ever heating, do not block or cover any of these openings. Do not place the printer in an enclosure unless the enclosure provides adequate ventilation.
4. Never push objects of any kind into the printer through the cabinet ventilation slots as they may touch dangerous high voltage points, create short circuits, cause a fire, or produce an electrical shock. Never spill liquid of any kind on the printer.
5. Do not place the printer in a location where someone may trip on the cords.
6. Select a work surface that is large enough to hold the printer.
7. Position the printer within six feet of the computer and within five feet of an electrical outlet.
8. Operate this printer using the power source (110V, 220V, etc) indicated on the marking label. If you are not sure of the type of power source available, consult your dealer or local power company.
9. If you need to use an extension power cord with this printer, make sure that it uses a three-wire grounded cord and that the total ampere ratings for all of the products using the extension do not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
10. Do not allow anything to rest on the power cord or data communications cable.
11. Unplug this printer from the wall outlet before cleaning. Do not use liquid cleaners or aerosol sprays. Use a damp cloth for cleaning.
12. Do not touch the surface of the photo-sensitive drum as marks or scratches may impair print quality.
13. Do not expose the drum unit to direct light for prolonged periods.
14. Use only standard papers, OHP films, and approved envelopes. Feed OHP films though the manual feed slot only. See specifications for approved papers and envelopes.
15. Other than replacing consumables such as paper and toner, refer all questions to qualified service personnel.

Especially mind the safety on the part with this mark.
You must use regular parts described in specifications for the parts inflammable and where the current can be flown. Otherwise any hazard such as an electric shock or a fire could occur.

LASER STATEMENT (LASERTURVALLISUUS)

WARNING : NEVER OPERATE AND SERVICE THE PRINTER WITH THE PROTECTIVE COVER REMOVED FROM LASER/SCANNER ASSEMBLY. THE REFLECTIVE BEAM, ALTHOUGH INVISIBLE, CAN DAMAGE YOUR EYES.

Class 1 laser product

Luokan 1 laserlaite
Klass 1 laser apparat

Allonpituus 770-795nm
Teho 0.3mW±0.03mW

CAUTION	INVISIBLE LASER RADIATION WHEN THIS COVER OPEN. DO NOT OPEN THIS COVER.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEOFFNET. NIGHT DEM STRAHL AUSSETZEN.
ATTENTION	REYONNEMENT LASER INVISIBLE EN CAS D'OUVERTURE. EXPOSITION DANGERUSE AU FAISCEAU.
ATTENZIONE	RADIAZIONE LASER INVISIBLE IN CASO DI APERTURA. EVITARE L'ESPOSIZONE LA FASCIO.
PRECAUCION	REDIACION LASER INVISIBLE CUANDO SE ABRE. EVITAR EXPONERSE AL RAYO.

CAUTION : Avoid exposure to invisible laser radiation when the development unit is not installed.

1-2 Precautions on Disassembly and Reassembly

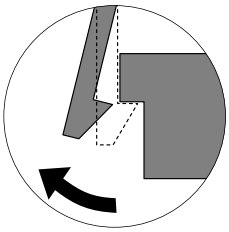
Very careful precautions should be taken when replacing parts. Before replacing, please check cables because you cannot put the cables that you removed for replacing parts into the proper place if you would not make sure of where they were connected and in which condition.

Please do the following before disassembling for a repair or replacement of parts.

1. Pull out paper cassette, printer cartridge installed. Especially careful not to be scratched by the surface of developer or not to expose them to light.
2. Turn the power switch off.
3. Take out the power plug, printer cable from the printer.
4. Use only the same type of part as original when replacing parts.
5. Do not force to open or fasten plastic material components.
6. Be careful that small parts such as screws should not get in the printer.
7. When disassembling, assembling, also observe small components are located in place.
8. If you uncover and turn the machine over to replace some parts, toner or paper particles may contaminate the LSU window. Protect the LSU window with clean paper.

Releasing Plastic Latches

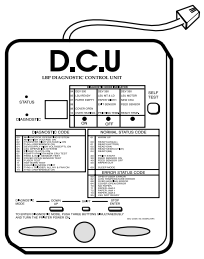
Many of parts are held in place with plastic latches. The latches break easily : release them carefully. To remove such parts, press the hook end of the latch away from the part to which it is latched.



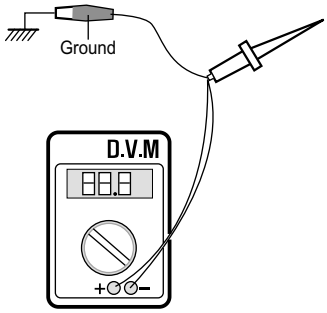
1-3 Tools for Troubleshooting

The following tools are recommended for safe and smooth troubleshooting described in this service manual.

1 **DCU(Diagnostic Control Unit)**
Standard: Test equipment to diagnose the Laser printer supplied by Samsung Electronics.

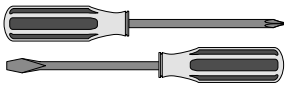


2 **DVM(Digital Volt Meter)**
Standard: Indicates more than 3 digits.



3 **Electronic Scale**
Standard: Equipment to check the weight of consumables(toner cartridge) supplied by Samsung Electronics. (The gram unit can be measured.)

4 **Driver**
Standard: "-" type, "+" type (M3 long, M3 short, M2 long, M2 short).

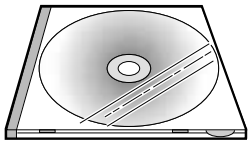


5 **Pinset**
Standard: For general home use, small type.

6 **Cotton Swab**
Standard: For general home use, for medical service.

7 **Cleaning Equipments a IPA(Isopropyl Alcohol)dry cloth or a soft stuff neutral detergent.**

8 **Software(Driver) installation CD ROM**



Note **Mind your hands not to be touched when you disassemble and reassemble PBA ASS'Y, such as the main board, SMPS, HVPS.**

2. Specifications

			ML-1650	ML-1651N
Engine	Speed		17 PPM(Letter) , 16PPM(A4)	
	Resolution		1200 * 1200	
	First Print Time		Tray 1 : Less than 14 seconds	
			Tray 2 : Less than 17 seconds	
	Warm-Up Time		Less than 40 seconds	
	Power Consump.		Print : 300 W, Sleep mode : Less than 20 W	
	Dimension(W * D * H)		361 x 409 x 294.5 mm	
	Weight		12.4 Kg/27.3lb (SET)	
	Acoustic Noice		Stand by : Less than 35 dB, Operating : Less than 49dB	
	Power Rating		AC 100~127V , 50 Hz	
			AC 220~240V , 60 Hz	
Controller	Processor		Power PC (166 MHz)	
	Memory	RAM	Standard : 16Mbyte	
			Option DIMM Module ; 16, 32,64,128M byte	
		ROM	4 Mbyte (16M bit x 2 : Program) Flash Memory	
		EEPROM	512 bytes	
	Emulation		PCL6, PS 3(Option)	
	Interface		IEEE1284, USB, Network	
	OS Support		Windows 95/98/2000/Me/NT, Linux(Radhat 6.0 ↑), iMac(Mac OS 8.0 ↑)	
	N/W		Option	Default
Paper	Input	Cassette	550 sheets (75g/m2)	
		MP Tray	100 sheets (75g/m2)	
			20 sheets (OHP)	
			10 sheets (Letter, card)	
			25 sheets (Label)	
	Output	Face down	250 sheets	
		Face up	100 sheets	
	Media Type		A4, Letter. Legal, Executive, B5, A5, Folio, 7 3/4(Monarch), #10, DL, C5, C6, B5	
Toner	Type		Single Cartridge	
	Life		8,000 sheets (Set : 4,000 sheets)	
	Cartridge		8,000 sheets (Set : 4,000 sheets)	
	Pick up Roller		60,000 sheets	
	Feed Roller		60,000 sheets	
	Transfer Roller		125,000 sheets	
	Fuser		40,000 sheets	
User interface	Key & LED		3Key, 4LEDs	
	LCD		No	
	Toner Save		YES	
	Reprint		YES(Button)	

			ML-1650	ML-1651N
Environment	Operation Environment	Temperature	10 ~32˚c (50˚F ~ 90˚F)	
		Humidity	20 ~ 80 % RH	
	Storage Environment	Temperature	-200 ~40˚c (4˚F ~ 104˚F)	
		Humidity	10 ~90 % RH	
	Network Operating Systems		Windows 95/98 and Windows NT (3.51, 4.x)	
			Netware (3.x, 4.x), NDS and Bindery Mode /RPRINT, PSERVER Mode	
			UNIX and Apple Talk	
Network	Network Protocols Supported		TCP/IP : Windows 95/98, Windows NT, UNIX	
			IPX/SPX : Windows 95/98, Novell Netware	
			DLC/LLC : Windows 95/98, Windows NT	
			Ethertalk : Apple Talk	
			SNMP : for Network Printer Administration	
	Network Card Interface		Ethernet 10/100 BaseTX (Auto Negotiation)	
	Network Management S/W		Samsung's Admin. Software Utility (SyncThru)	
			SNMP and MIB-II Support,	
			GUI based utility for Windows Systems and Test based utility for UNIX Systems	
			HTTP server for web browser based network manage-	
			ment (can manage NPC and printer options on Web Browser)	

3. Disassembly and Reassembly

3-1 General Precautions on Disassembly

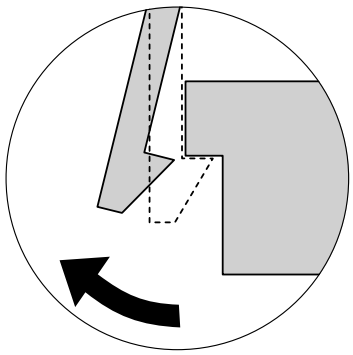
When you disassemble and reassemble components, you must use extreme caution. The close proximity of cables to moving parts makes proper routing a must. If components are removed, any cables disturbed by the procedure must be restored as close as possible to their original positions. Before removing any component from the machine, note the cable routing that will be affected.

Whenever servicing the machine, you must perform as follows:

1. Remove the paper cassette(s), and the print cartridge. Do not expose the cartridge to direct room light or sun light, and be careful not to scratch the drum surface.
2. Turn the power switch off.
3. Unplug all the cables from the printer.
4. Replace with only an authorized component.
5. Do not force to open or fasten a plastic material component.
6. Be careful no obstacles are included when you reassemble components.
7. When you reassemble components, be careful small size components are located in place.
8. If you turn the machine over to replace some parts, toner or paper particles may contaminate the LSU window. Protect the LSU window with clean paper.

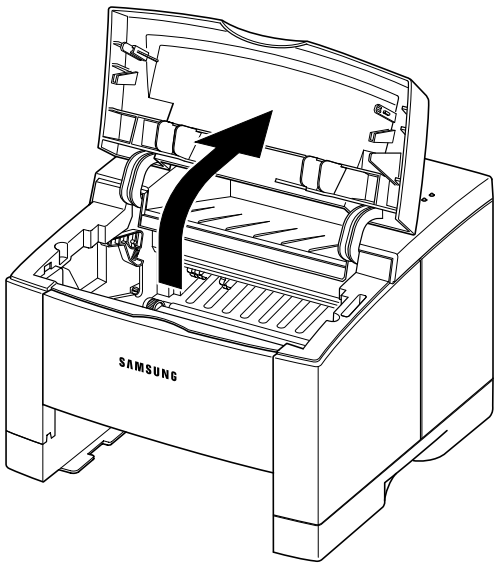
Releasing Plastic Latches

Many of the parts are held in place with plastic latches.
The latches break easily; release them carefully.
To remove such parts, press the hook end of the latch away from the part to which it is latched.

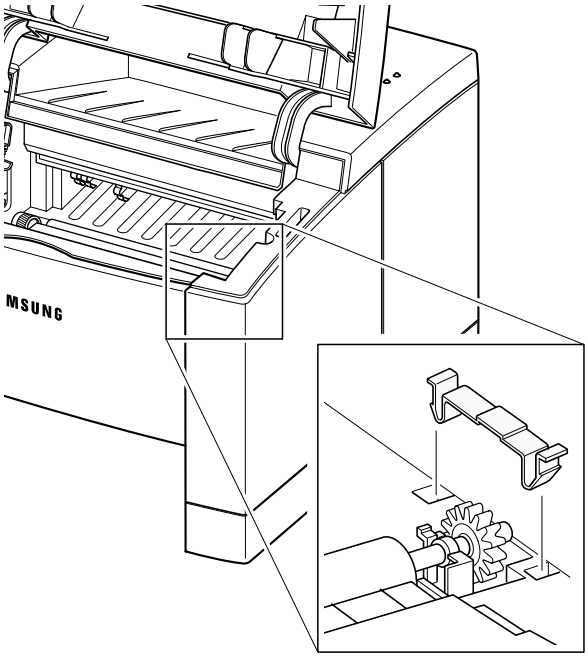


3-2 Transfer Roller

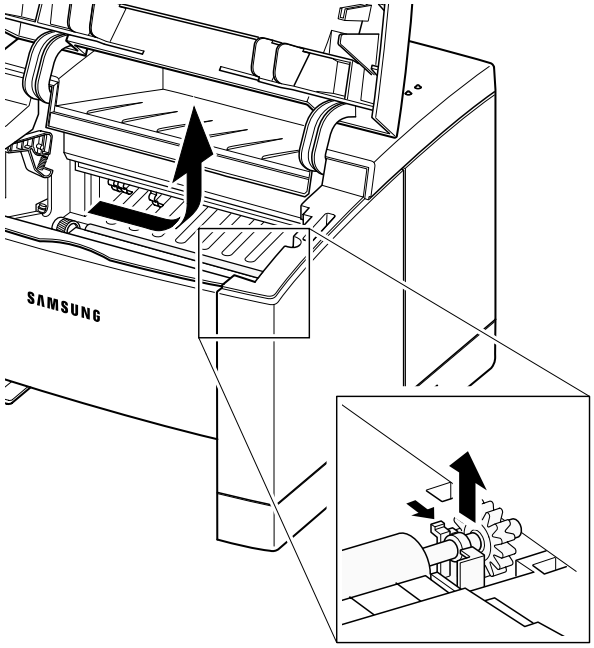
1. Open the printer cover.



2. Remove the cap.

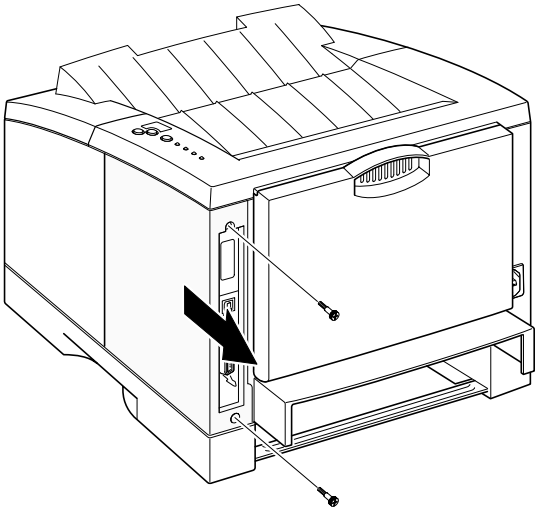


3. Hold the cap at the both end of the roller, then remove the roller.

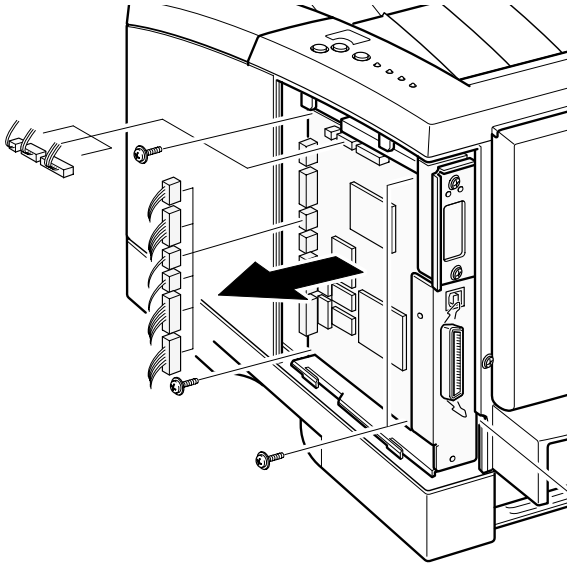


3-3 Controller Board

1. Remove two screws and remove the controller cover.

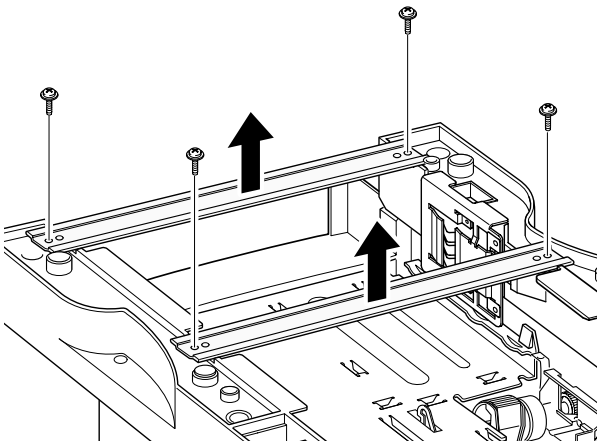


2. Remove five screws securing the board and unplug all connectors, and then take the controller board out of the printer.

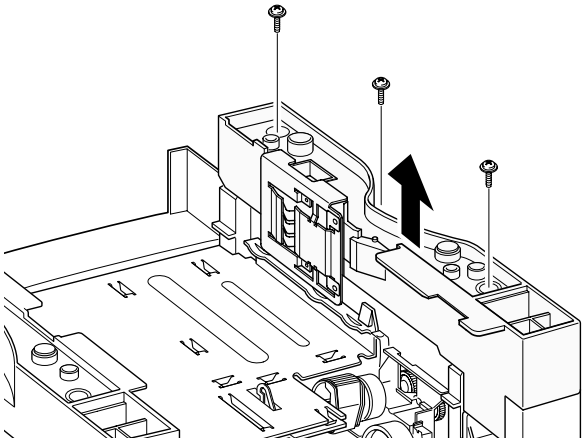


3-4 Pickup Assembly

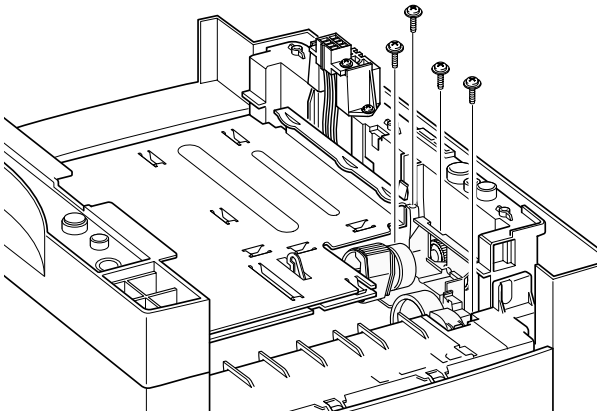
1. Turn the printer upside down. Remove four screws, then remove the bar cross bottom.



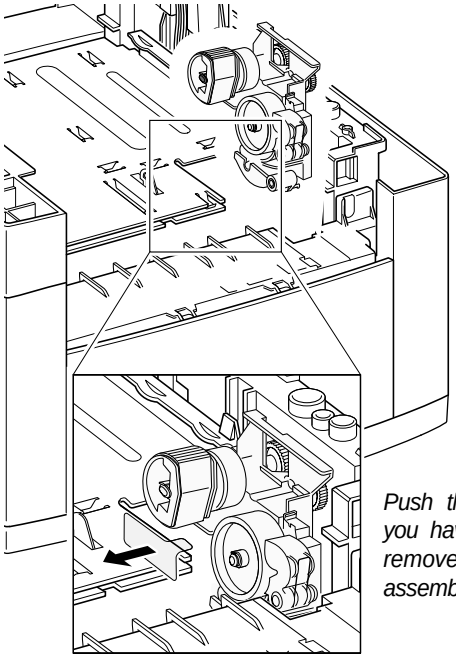
2. Remove three screws from the left base bracket, and take the bracket out.



3. Remove four screws securing the pickup assembly.

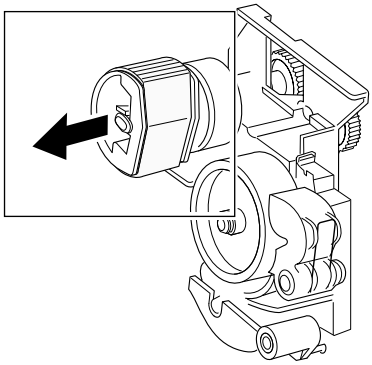


4. Take the assembly out.

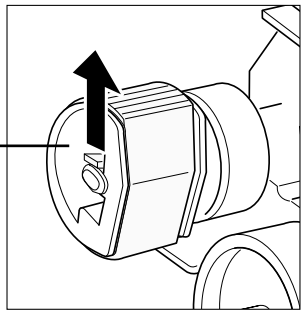


Push the solenoid if you have difficulty to remove the pickup assembly.

5. Check the pickup rubber wear. If the rubber is heavily worn, replace it with a new one.

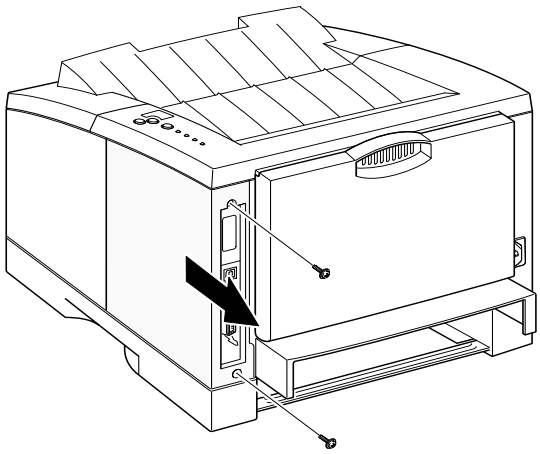


Squeeze this tab to remove the rubber.

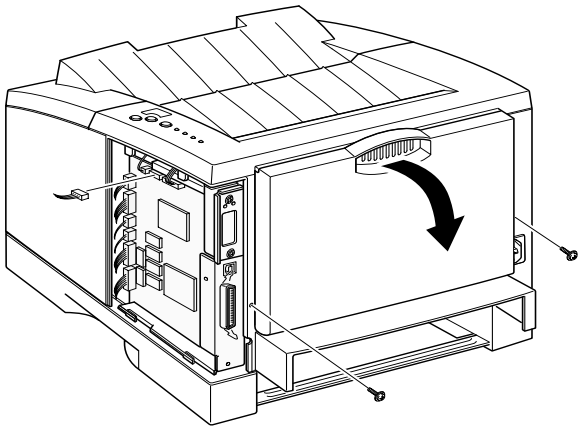


3-5 Main Cover

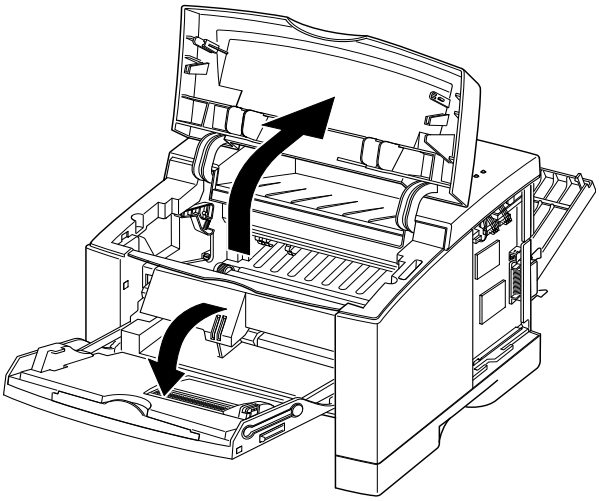
1. Remove two screws and remove the controller cover.



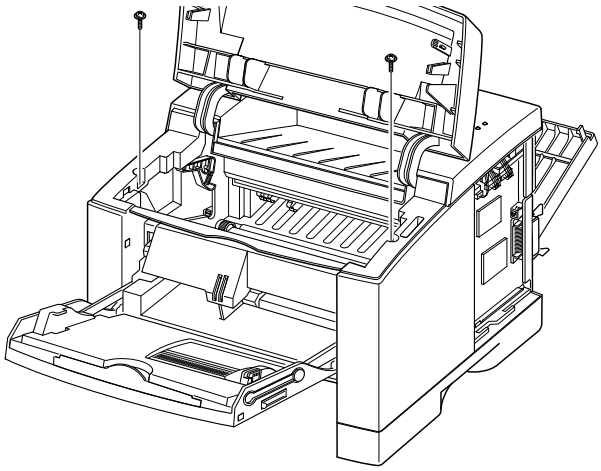
2. Remove two screws at the back of the printer and unplug one connector from the board, then open the rear cover.



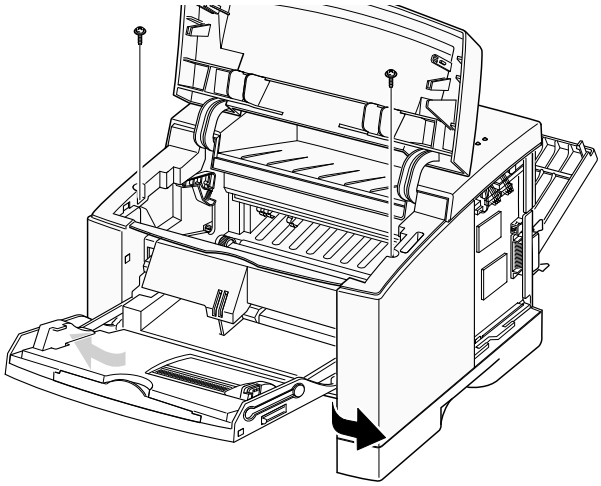
3. Open the printer cover, and open the MP tray.



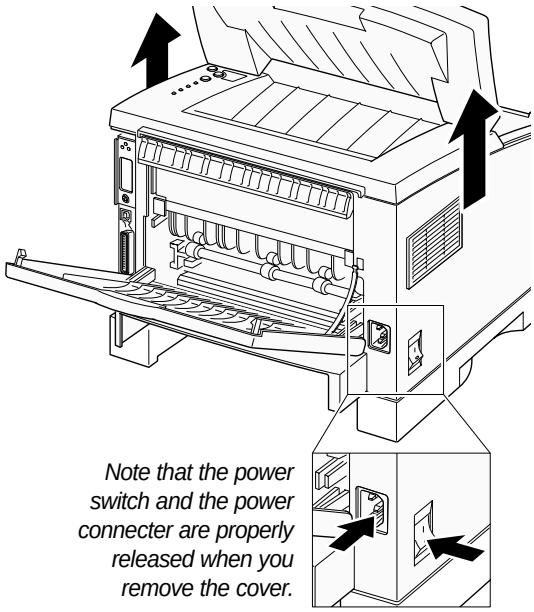
4. Remove two screws securing the main cover.



5. Unlatch the front ends of the cover.



|6. Slide the main cover upward, out of the printer.



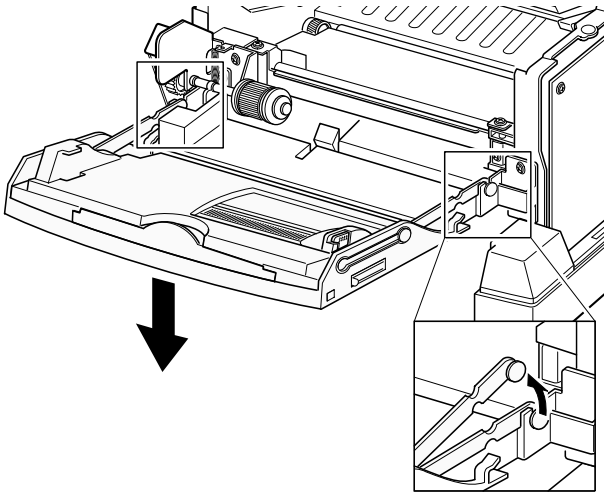
Note that the power switch and the power connecter are properly released when you remove the cover.

3-6 MP (Multi-Purpose) Tray

1. Before you remove the MP tray, you should remove:

   -Main Cover (see page 3-5)

2. Remove the stoppers securing the MP tray.

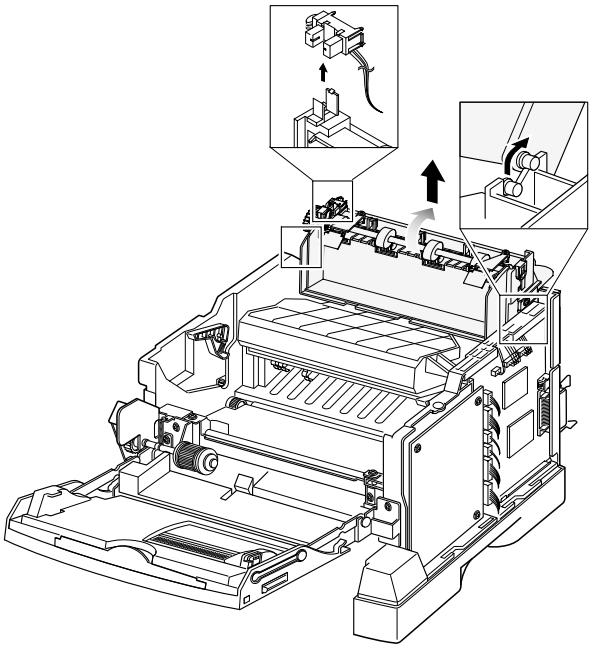


3-7 Exit Assembly

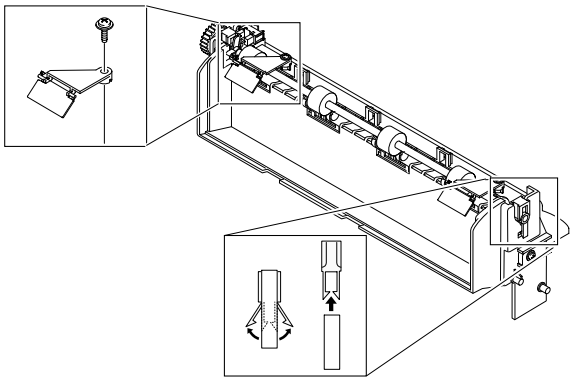
1. Before you remove the exit assembly, you should remove:

   -Main Cover (see page 3-5)

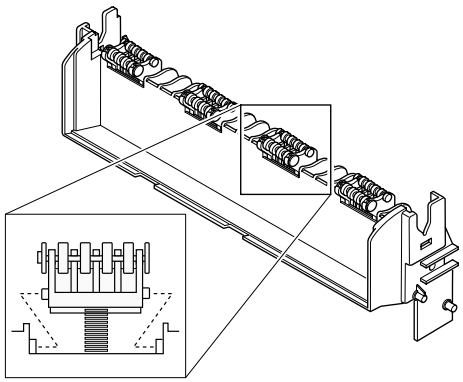
2. Remove the exit tray in the direction of arrow.



3. If you want to remove the roller shaft, unlatch both ends of the shaft and take it out.



4. If you want to remove the exit roller, squeeze the bottom of the roller and take it out.

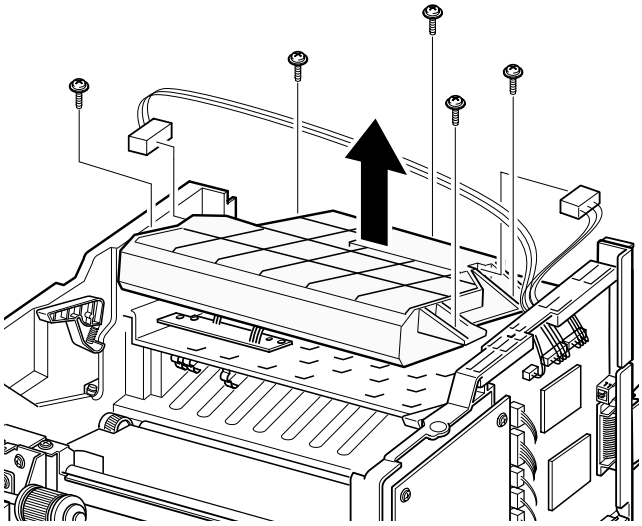


3-8 LSU

1. Before you remove the LSU, you should remove:

   -Main Cover (see page 3-5)
   -Exit assembly (see page 3-7)

2. Remove five screws, and remove the LSU. Then unplug two connectors from the LSU.

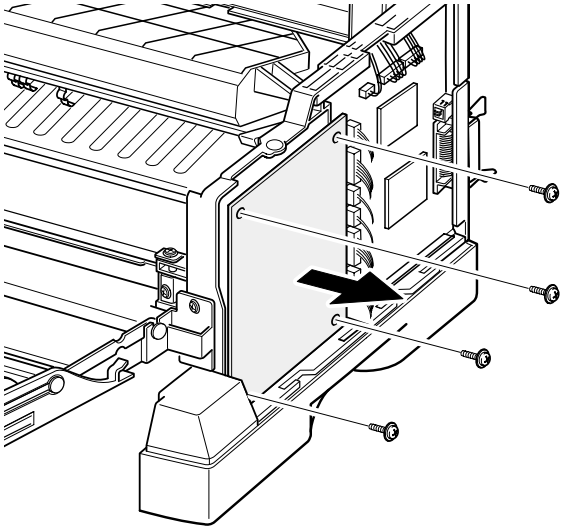


3-9 HVPS board

1. Before you remove the HVPS board, you should remove:

   -Main Cover (see page 3-5)

2. Remove four screws and take the HVPS board out.

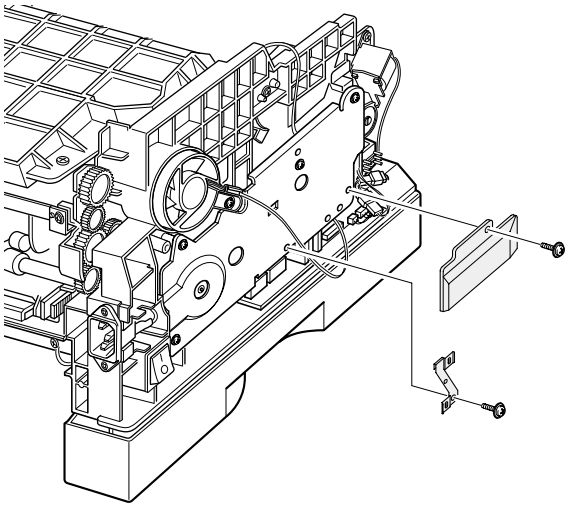


3-10 Fan

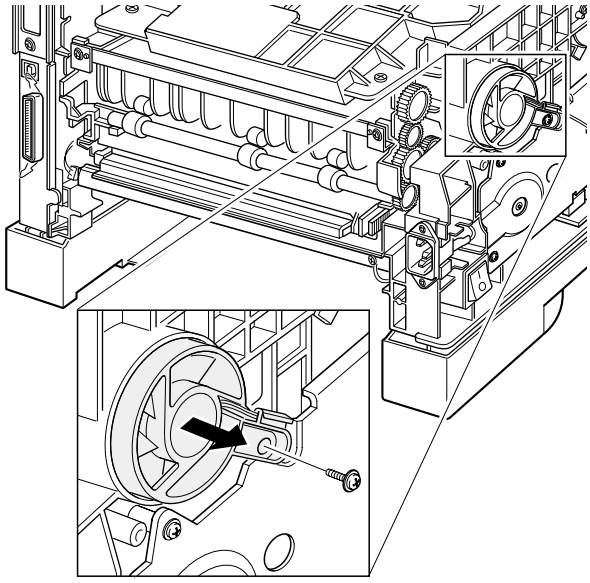
1. Before you remove the fan, you should remove:

   -Main Cover (see page 3-5)

2. Remove two screws securing the connector cover and harness bracket from the gear bracket.



3. Remove one screw, and remove the fan. Then unplug one connector.

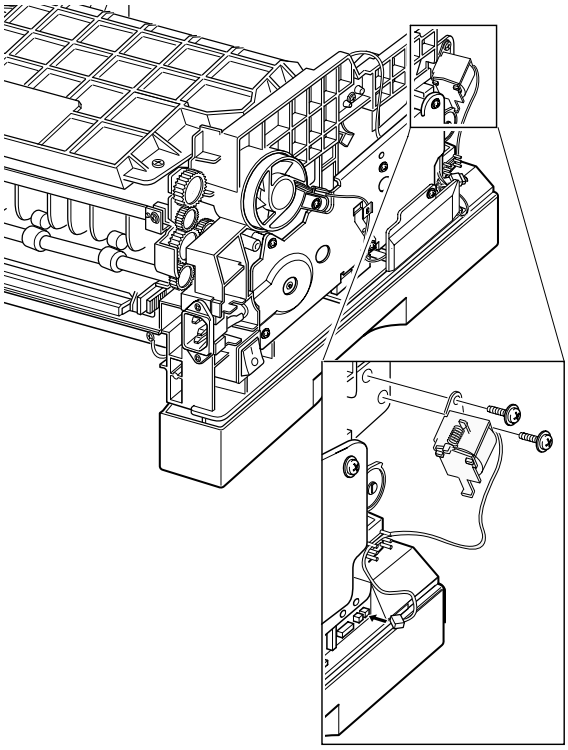


3-11 Solenoid

1. Before you remove the solenoid, you should remove:

   -Main Cover (see page 3-5)

2. Remove two screws, and remove the solenoid. Then unplug one connector.

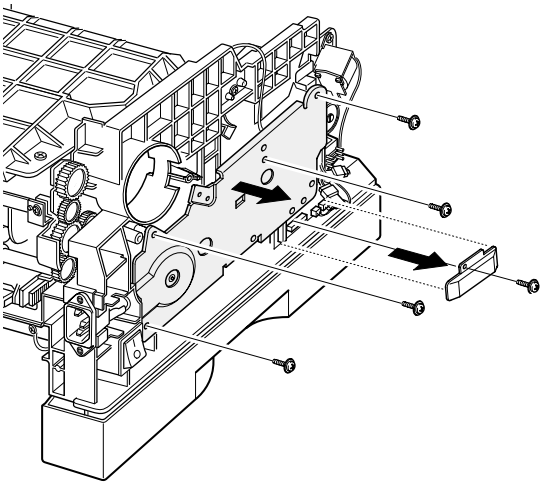


3-12 Drive Assembly

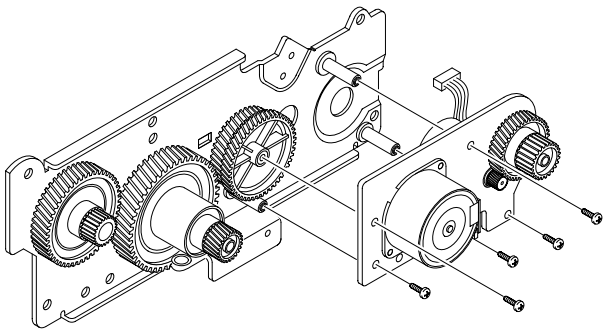
1. Before you remove the drive assembly, you should remove:

   -Main Cover (see page 3-5)
   -Fan (see page 3-9)

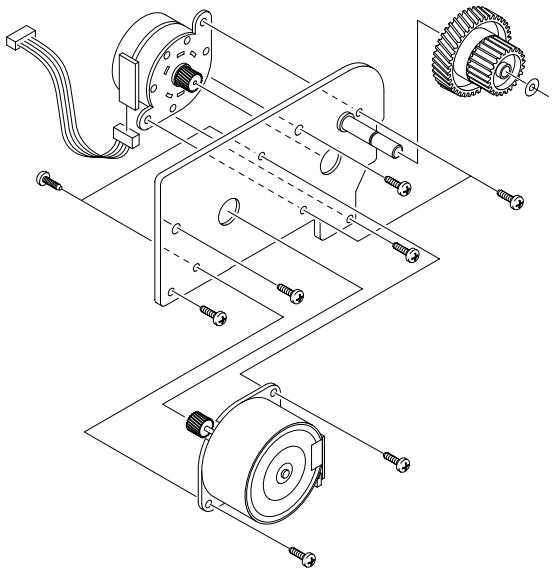
2. Remove four screws securing the drive assembly from the gear bracket and unplug one connector from the motor, and then take the drive assembly out.



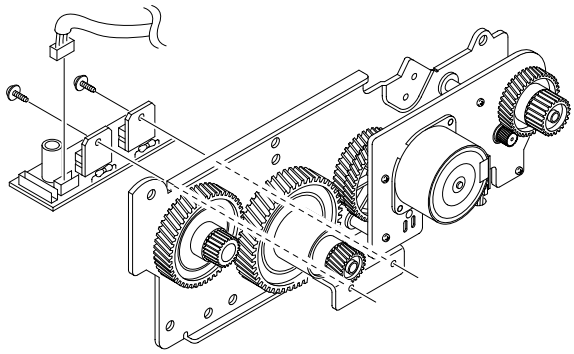
3. If you want to remove the motor assembly from the drive assembly, remove five screws securing the motor assembly to the gear bracket.



4. If you want to remove the step motor, remove four screws securing the step motor from the motor bracket and unplug two connector from the motor.



5. If you want to remove the motor joint PCB, remove two screws securing the motor joint PCB from the gear bracket and unplug one connector from the motor joint PCB.

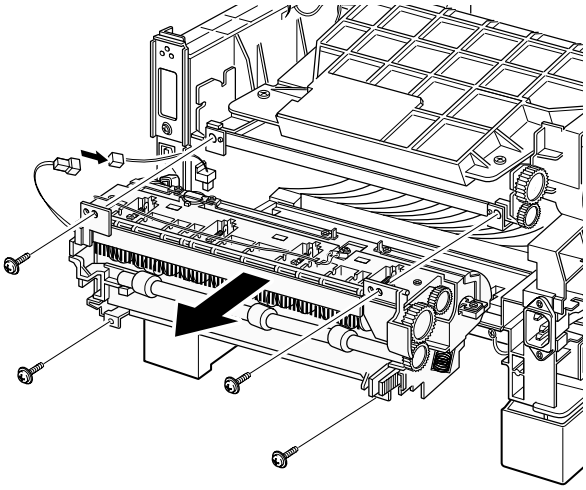


3-13 Fuser Assembly

1. Before you remove the fuser, you should remove:

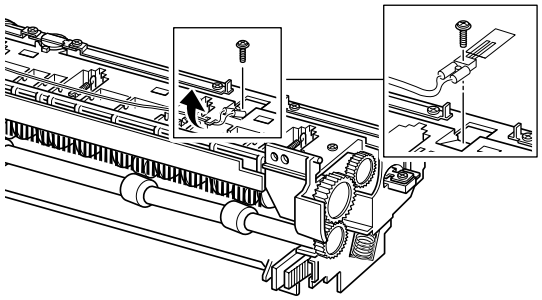
   -Main Cover (see page 3-5)

2. Remove four screws and unplug one connector, and then remove the fuser assembly.



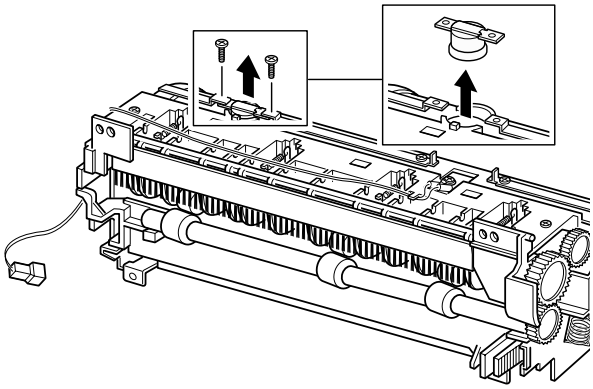
♦ **To remove the thermistor from the fuser assembly :**

Remove one screw, and release the wire from the three holders, and then take the thermistor out.



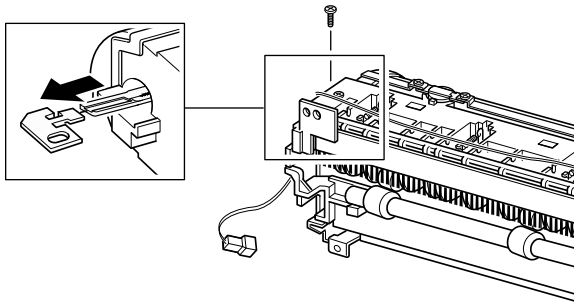
♦ **To remove the thermostat from the fuser assembly**

Remove two screws and take the thermostat out.

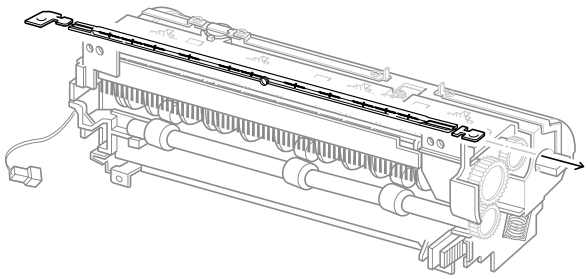


♦ **To remove the halogen lamp from the fuser assembly :**

Remove two screws and take the halogen lamp out of the fuser assembly.



Note When you reassemble the halogen lamp, make sure that it is inserted into the slot properly.

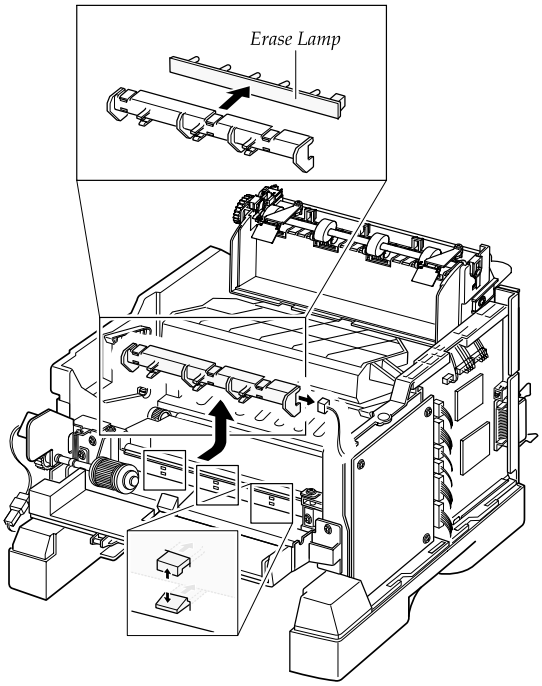


3-14 Guide Feed & Erase Lamp

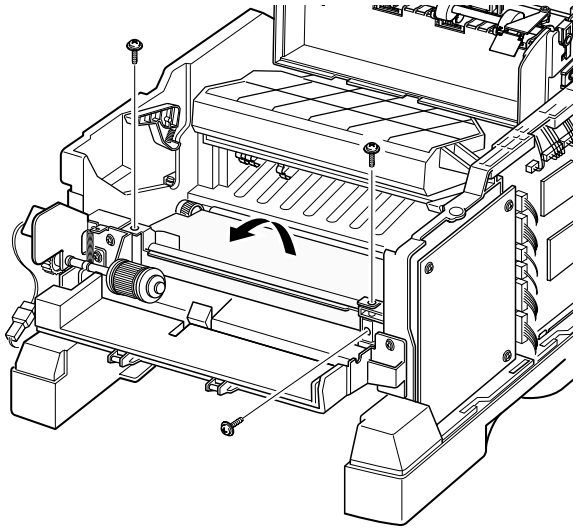
1. Before you remove the guide feed & PTL, you should remove:

   -Main Cover (see page 3-5)

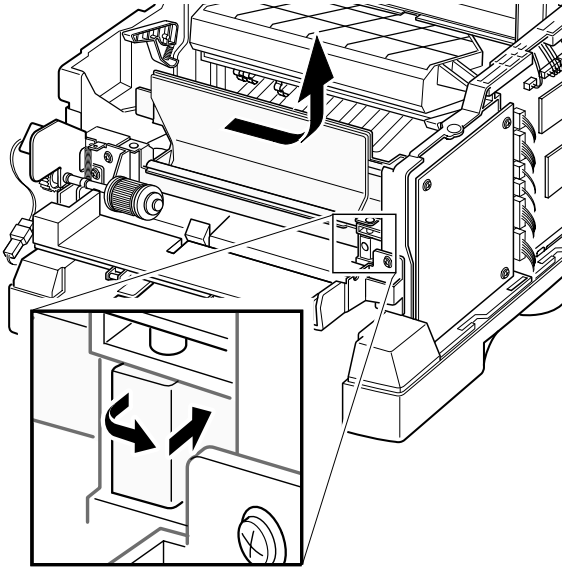
2. Release the latches on the erase lamp from the MPF ASS'Y and unplug one connector, then remove the PTL.



3. Remove three screws and raise the guide feed in the direction of arrow.



4. Remove the guide feed& erase PTL.

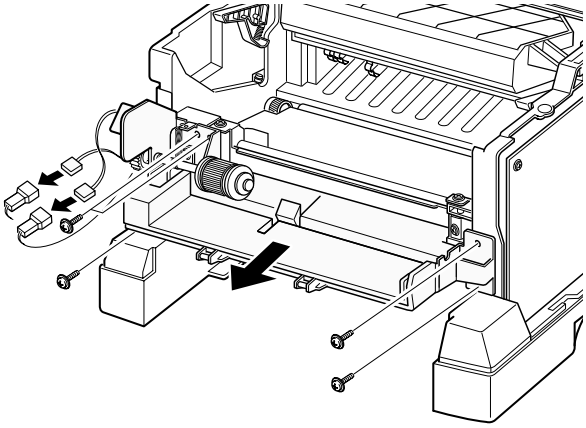


3-15 MPF Assembly and Miscellaneous on MPF Assembly

1. Before you remove the MPF assembly, you should remove:

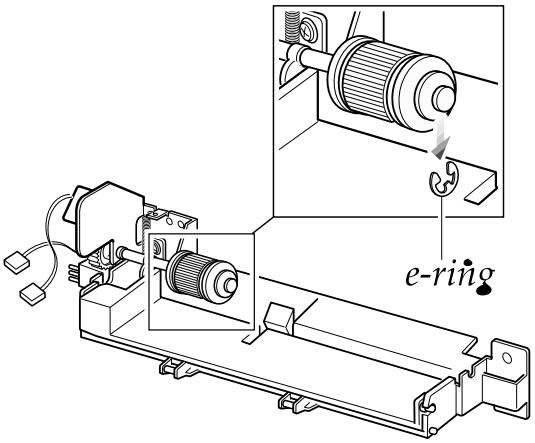
   -Main Cover (see page 3-5)

2. Unplug two connectors and remove five screws, and then take the MPF assembly out.

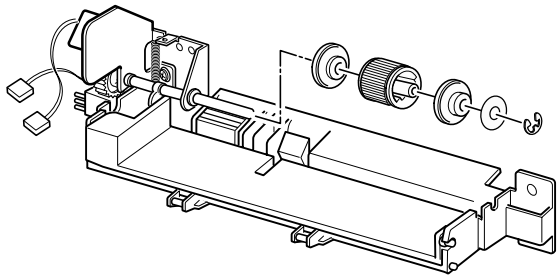


♦ **To replace the pickup roller :**

1. Remove the e-ring.

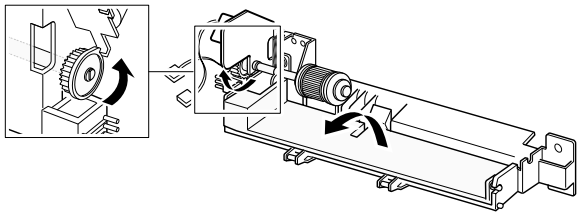


2. Remove the roller.

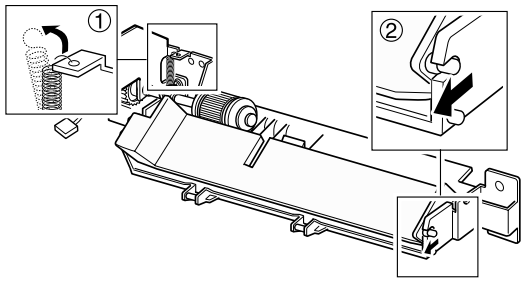


♦ **To replace the nockup plate :**

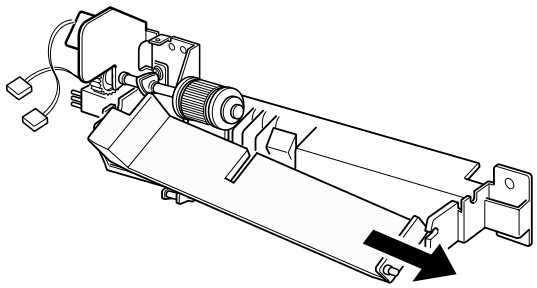
1. Turn the gear shown in the square in the direction of arrow to release the nockup plate.



2. Remove the spring , then release the right end of the plate.

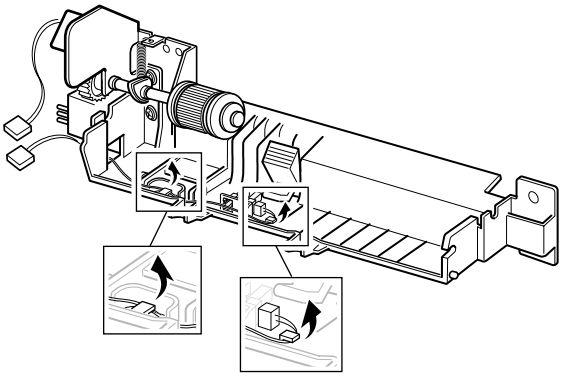


3. Remove the nockup plate.

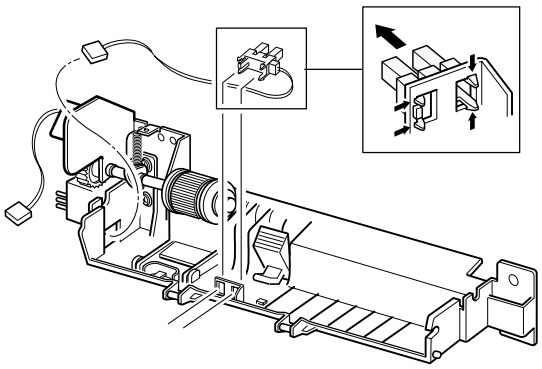


♦ **To replace the Paper Empty (PE) sensor :**

1. Release the wire from the two holders.

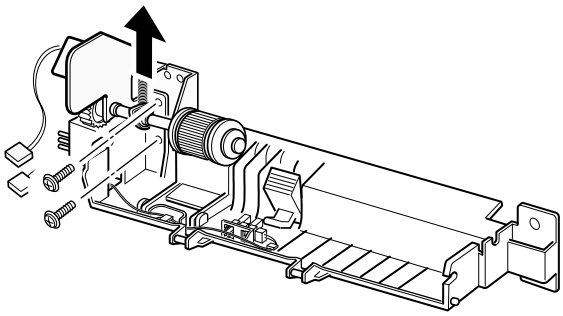


2. Raise the pickup holder in the direction of arrow.

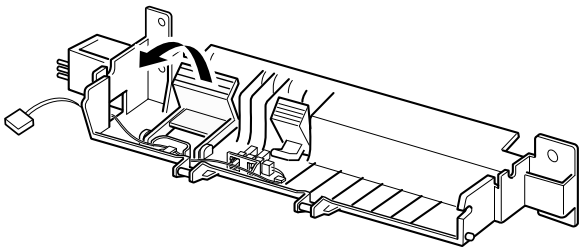


♦ **To replace the pickup holder and the Adjust End MP:**

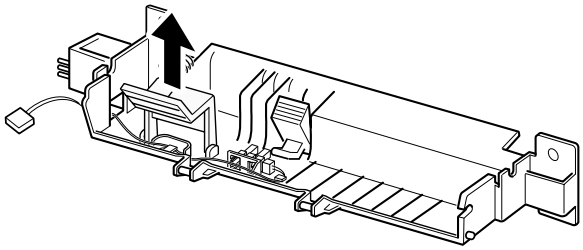
1. Remove two screws and remove the MPT bracket.



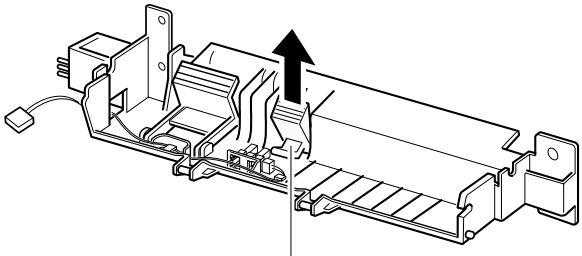
2. Unlatch the PE sensor, then take it out.



3. Remove the pickup holder.



4. Remove the Adjust End MP



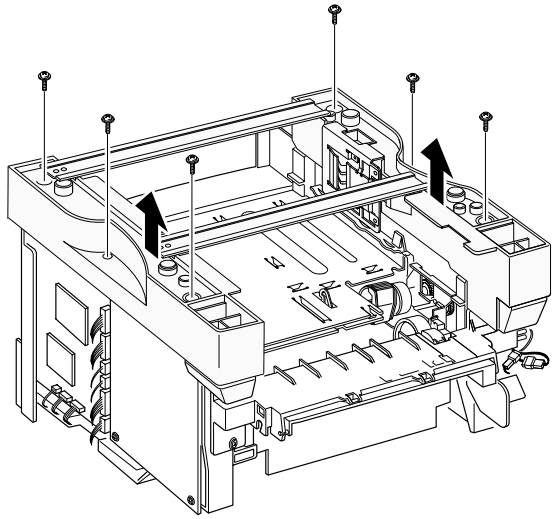
Adjust End MP

3-16 Engine Board and Miscellaneous

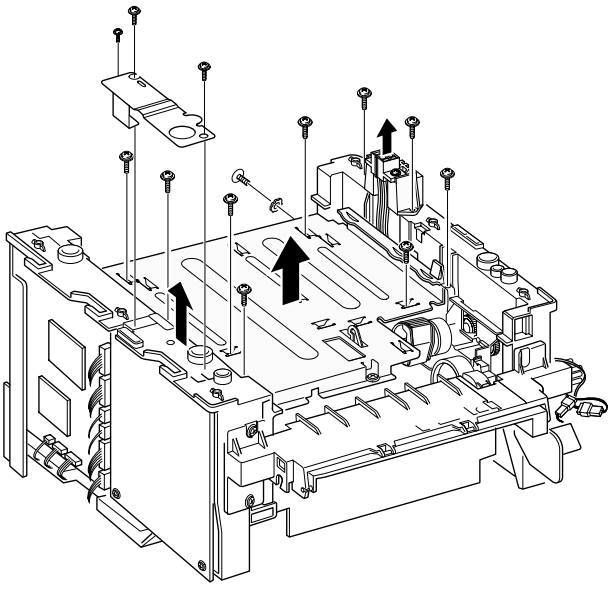
1. Before you remove the engine board, you should remove:

   -Main Cover (see page 3-5)

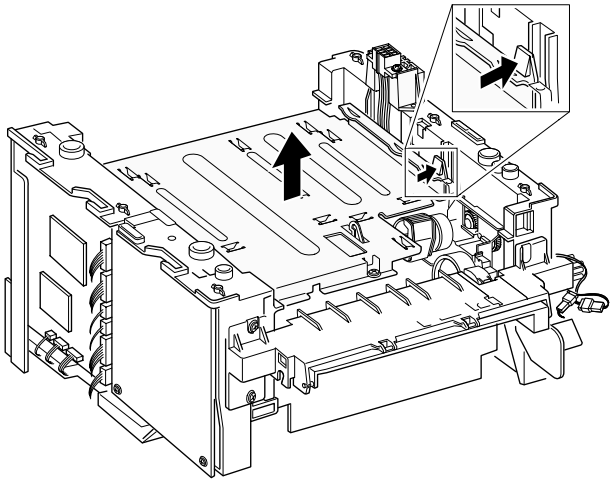
2. Remove six screws from the left and the right base bracket and take them out.



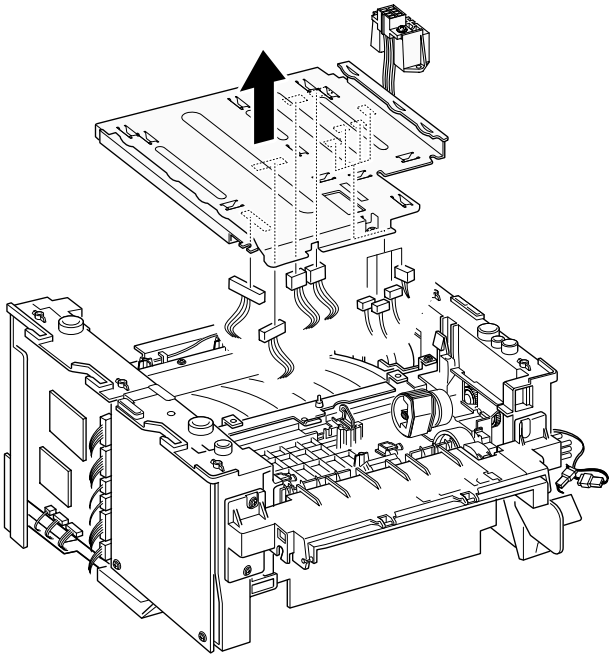
3. Remove eight screws securing the PCU shield and remove two screws securing the SCF connector, and then take the PCU shield out of the printer.



4. While you push the latch to release the PCU shield, take the PCU shield out of the printer.

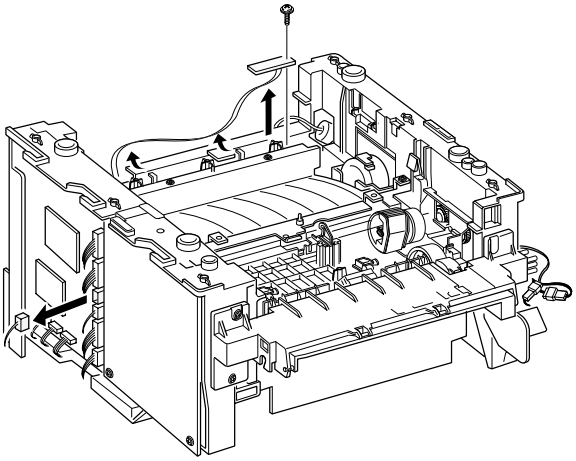


5. Unplug all connectors from the PCU shield, and remove the shield.



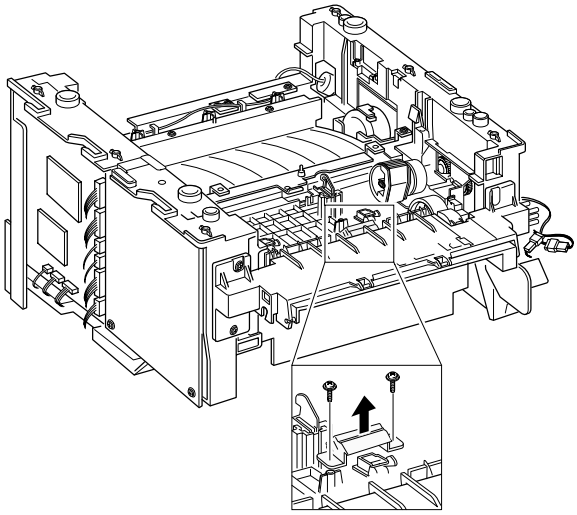
♦ **To replace the exit board :**

Unplug one connector from the controller board and remove one screw securing the board. Then release the wire from two holders and take the board out.



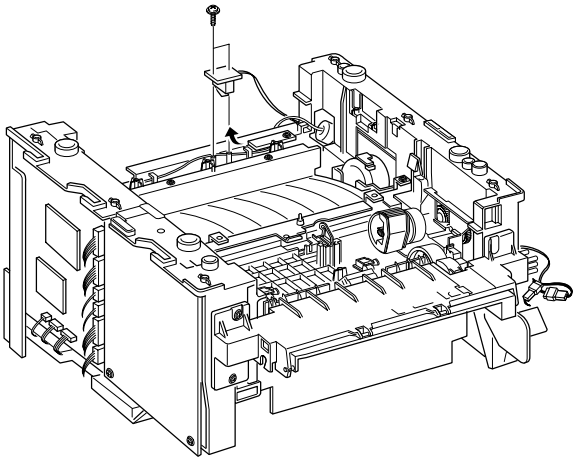
♦ **To replace the Cap sensor :**

Remove two screws and take it out.



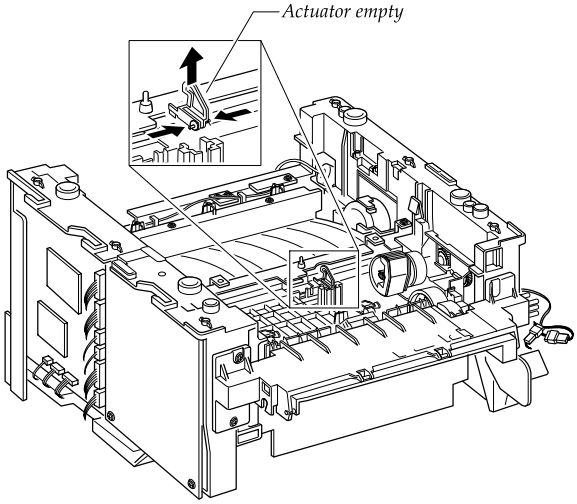
♦ **To replace the fuser sensor :**

Remove two screws and take it out.



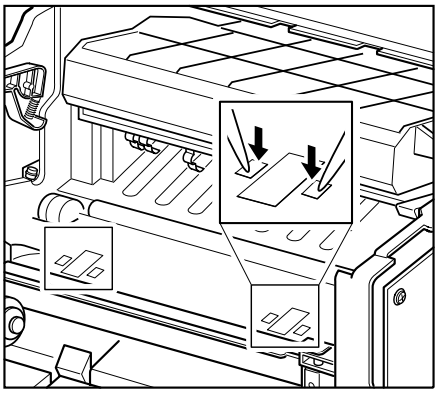
♦ **To replace the actuator empty :**

Take the sensor out while you squeeze the both ends of the sensor.

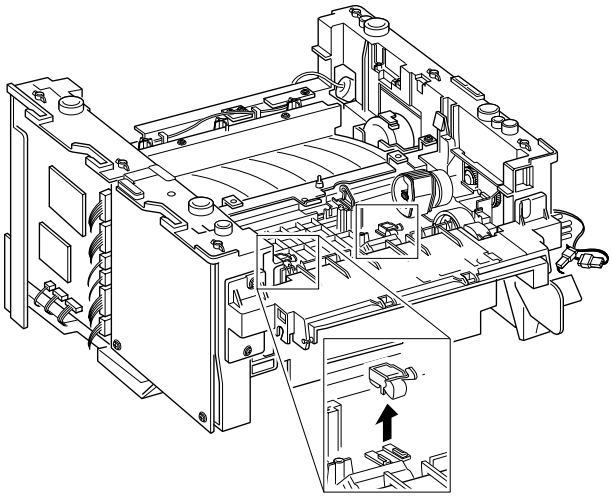


♦ **To replace the actuator feed**

1. Turn the mechanism back and push down the points as shown to unlatch the actuator feed.

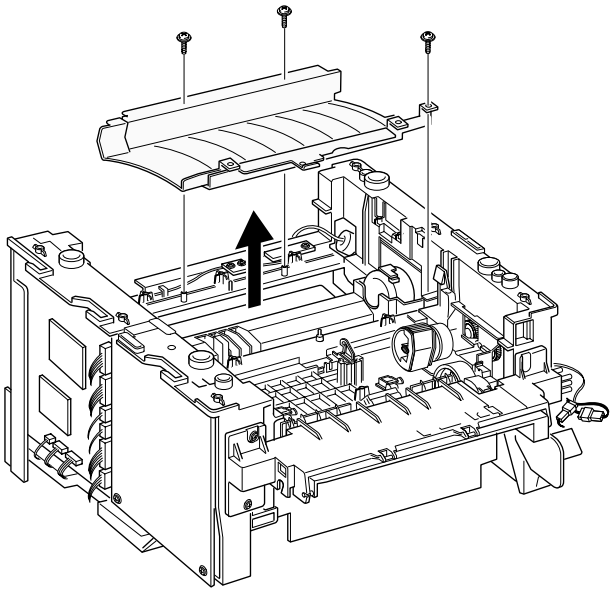


2. Turn the unit over again, and remove the actuator feed.



♦ **To remove the transfer guide :**

Remove three screws and take the guide out.



4. Troubleshooting

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4-1 How to use DCU

4-1-1 DCU Setup

You can examine the malfunction of the printer. To perform DCU, open the front discharge cover and leave the connect the harness wire(10 pin/4 pin) to the CN10(4 pin) of the Main control board.

4-1-2 Code

Connect DCU to the printer and turn the power on. It show 7 LED on the panel and each code tells the function of the printer.

Normal Code

While printing or warming up, it indicate the position of the paper

61	Warm up	The printer is on, the cover is open or close.
00-05	Ready(kind of paper)	The printer is ready, the paper is detected when the first paper is printed. 00: Legal ,01: Letter ,02: A4 ,03: EXEC ,04: B5 ,05: Folio, 06: A5/A6
20, 21, 22	Print Start	The engine controller received the print order from the video controller. 20: 1st, 21: MP, 22: SCF
30	Feed Sensor On	The paper is passing out of the Feed Sensor.
40	Feed Sensor off	The paper has passed out of the Feed Sensor.
50	Paper Out	The paper has passed out of Exit Sensor.
69	Sleep Mode	The fuser power turned off to minimize the power consumption.

Error Code

When detecting the malfunction, the printing is stopped to indicate error code.

60, 62, 68	Fuser Error	The error in the fuser occurred. There is a short circuit in the thermistor and the thermostat while printing, Low Temperature Error occurs.
		• 60: Open Fuser Error • 62: Low Heat Error • 68: Over Heat Error
64	Cover Open	The Printer Cover is open.
65	CRU Error	The Toner Cartridge not installed,
70	No Paper	No paper in the paper cassette.
71	Paper Jam 0	The front part of paper is jammed between pickup unit and Feed sensor.
72	Paper Jam 1	The front part of paper is jammed between the Discharge sensor and Feed sensor.
73	Paper Jam 2	The front part of paper is jammed just after passing through the discharge sensor.
76	Out Bin Full	The Out bin is filled with paper.
95	LSU Not Ready	LSU Scanner Motor not ready or Hsync signal not output.

4-1-3 Self Diagnostic Mode

If Error code occurs due to malfunction of the printer, perform Self Diagnostic Mode to solve the problem.

The printer works only in the self-test mode to solve the malfunction problem.
To enter the self-test mode, turn the power on pressing the buttons of [Down], [Shift] and [Stop] at the same time. Release the button within 2 or 3 seconds if 78 shows in the DCU. If 00 shows in the DCU, press the button [Up] or [Shift] to select the self+test , and press the button of [Enter] to operate. To stop, press the button of [shift] and [Enter] together.

00	**Main Motor Operating System** Only the main motor is in operation.
01	**Main High Voltage On(THV-)** -1400 voltage output by MHV terminal. ⚠ Caution : High voltage probe should be used.
02	**Transfer High Voltage(-)On(THV-)** -1000 voltage output by MHV terminal. ⚠ Caution : High voltage probe should be used.
03	**Transfer High Voltage (+)Reference on (THV +)** +800 voltage output by MHV terminal. ⚠ Caution : High voltage probe should be used.
04	**DEV/supply High Voltage : DEV/Supply High Voltage Test.** The left one of the three LEDs in the self-test panel is on when DEV high voltage Supply high voltage output by each HV terminal(-500V). Press the [Up] button to switch the voltage. The middle and right one of the three LEDs are on and -650 voltage output by DEV HV terminal. ⚠ Caution : High voltage probe should be used.
05	**LSU Operating System** The scanning motor of LSU is in operation, the right LED of the three buttons on. Press the [Up] button to Check LD. LD is functioning and the middle button is on. If the LD is normal, all LEDs are on.
06	**Pickup clutch on** The Solenoid in the printer is in operation. To stop the operation, Press the button [shift] and [Enter] together.
07	**Paper Empty(1st, SCF, MF) Sensor Test :** If activate the Actuator of the PEMPTY/PWIDTH Sensor, the left and right of the three LEDs are on. Paper Empty Sensor (1st) ON/OFF — 1st LED ON/OFF Paper Empty Sensor (SCF) ON/OFF — 2nd LED ON/OFF Paper Empty Sensor (MP) ON/OFF — 3rd LED ON/OFF Increment DCU Code No. (08, Sensor TEST)
08	**Feed & Exit Sensor Test** Test the Feed sensor and Discharge sensor in the same way as '06'.
09	**Cover Open Sensor Test** The same way as code '06'.
10	**Fuser Test** If the [Enter] button pressed, the right LED is on and temperature of the fuser is up to READY Mode. If the [Up] button pressed, the middle LED is on and temperature of the fuser is up to Printing Mode. If you press the button once more, the left LED is on and temperature of the fuser is up to overheat Mode.
11	**Hot Burn Test** If the [enter] button pressed, the printer is continuously printing without detection. Turn the power off to stop operation.
12	**Cleaning Mode Print Mode** Print the paper to clean the OPC Drum in the Cartridge.

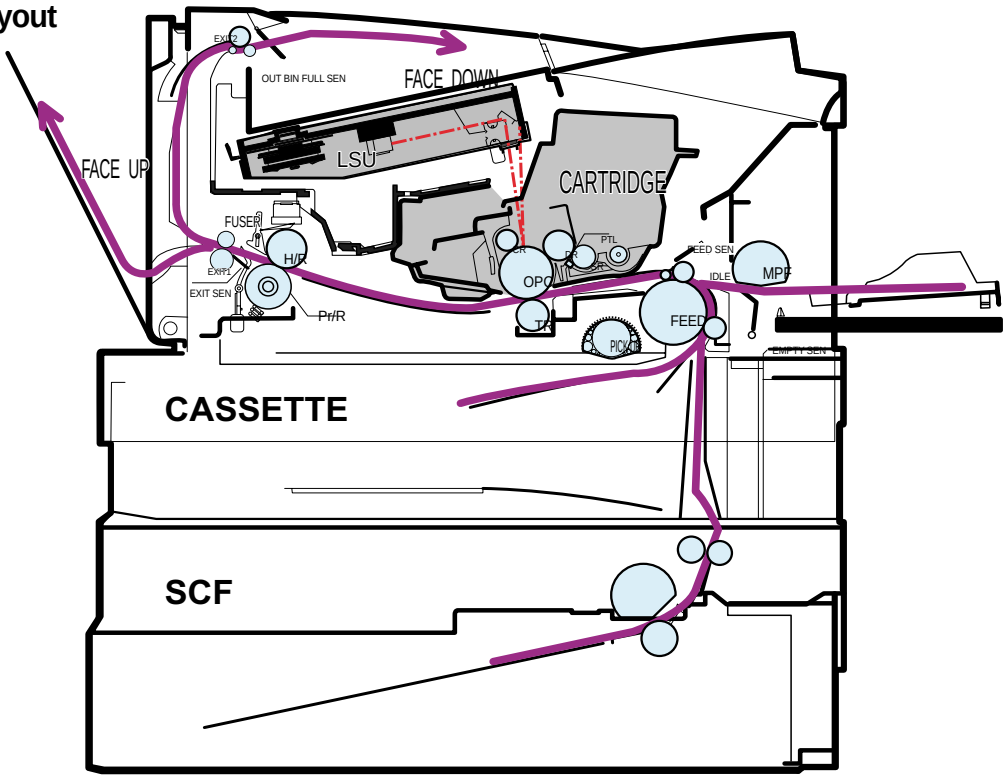
13	**THV(+) TRIGGER. ALL HV :** All high voltage output by each HV terminal and LSU and the fan is in operation. In this mode, electronic resistance of transfer roller and high voltage is detected.
14	**+7P Clutch Test :** Same method of the code '06'.
15	**Fan Test :** Indicates the function of the fan, same method of the code '06'.
16	**Paper size Sensor Test :** Cassette Sensor 1 ON/OFF — 1st LED ON/OFF Cassette Sensor 2 ON/OFF — 2nd LED ON/OFF Cassette Sensor 3 ON/OFF — 3rd LED ON/OFF Increment DCU Code No. (00,MAIN MOTOR TEST) Decrement DCU Code No. (15, FAN TEST)
17	**SMD Test :** This function is for a manufacturing process. You can test all diagnostic Codes(0~06). When you push the 'Enter' button, the main motor runs (Diagnostic Code 00). If you push the 'up' botton, the current diagnostic Code stops, and the next diagnostic Code starts.

4-1-4 Self Test Button

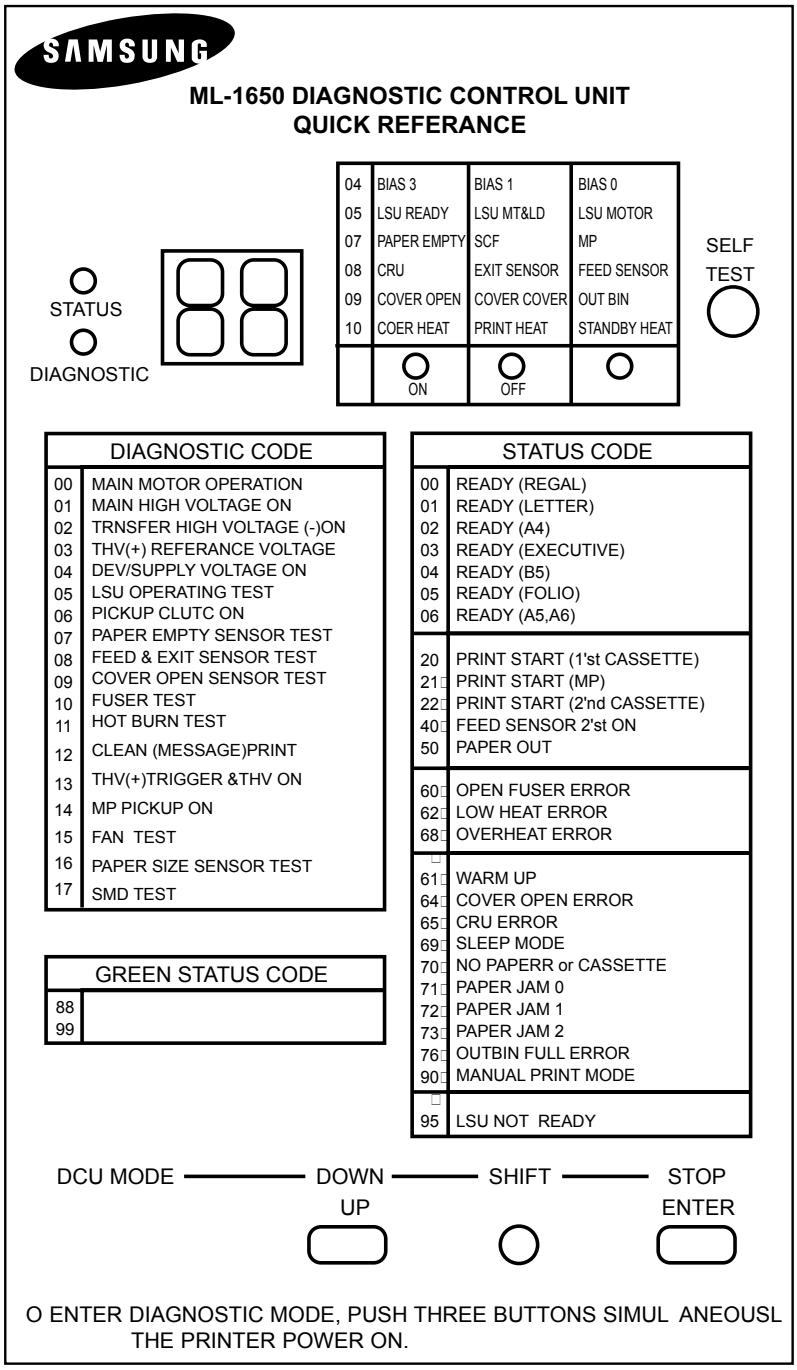
If the Self-Test button pressed, vertical lines are printed.

Turn the power on while pressing this button, '89' shows in the DCU and the printer is warming up. After warming-up the printer is in READY Mode, and '88' shows in the DCU. In this mode, without any detection, the printer begins printing(trial printing and data from the PC). It is convenient to use this mode when the engine malfunction is detected in the control board.

4-1-5 Paper Path Layout



4-1-6 DCU Panel



4-2 The cause and solution of Bad image

4-2-1 Vertical Black Line and Band

• Description

1. Straight thin black vertical line occurs in the printing.
2. Dark black vertical band occur in the printing.

Check and Cause	Solution
1. Damaged develop roller in the Developer. Deformed Doctor-blade or cleaning-blade.	1. If causes 1 and 2 occur in the developer cartridge, replace the developer and try to print out.
2. Scratched surface of the discharge roller in the developer.	2. Replace the transfer roller if occurred as No. 3.
3. Partly depression or deformation on the surface of the transfer roller.	

4-2-2 Vertical White Line

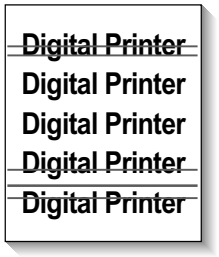
• Description White vertical voids in the image.

Check and Cause	Solution
1. Foreign matter stuck onto the window of internal lenses of LSU mirror.	1. Foreign matter stuck onto the window : Clean the LSU window with recommended cleaner(IPA) Clean the window with a clean cotton swab.
2. Foreign matter or toner particles between the developer roller and blade. (In case the life of the developer has been expired, white lines or light image occur in front of the image.)	2. Foreign matter in the LSU : Open the cover of LSU and clean with a cotton swab on the surface of the reflex mirror.
3. It may occur when Burr and foreign substances are on the window of the developer frame.	3. No 3. : Remove the foreign matter and burr of the exposure window. (Developer cartridge)
4. If the fuser is defective, voids occur periodically at the top of a black image.	4. No. 4. : Open the front cover and check ribs that corresponds to the position of the voids. Remove if found.
	5. If the problems are not solved, replace the developer cartridge.

4-2-3 Horizontal Black Band

• Description

1. Dark or blurry horizontal stripes occur in the printing periodically. (They may not occur periodically.)

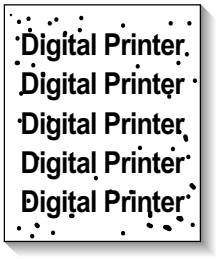


Check and Cause	Solution
1. Bad contacts of the voltage terminals to developer.	1. Clean each voltage terminal of the Charge, Supply, Develop and Transfer roller. (remove the toner particles and paper particles)
2. The rollers of developer may be stained. Charge roller = 38.5mm Supply roller = 51mm Develop roller = 50mm Transfer roller = 56.8mm	2. Clean the right Gear that has relatively small gap of the teeth in the OPC.
	3. If the malfunction persists, replace the developer.

4-2-4 Black/White Spot

• Description

1. Dark or blurry black spots occur periodically in the printing.
2. White spots occur periodically in the printing.



Check and Cause	Solution
1. If dark or blurry black spots occur periodically, the rollers in the Developer may be contaminated with foreign matte or paper particles. (Charge roller : 38.5 mm interval OPC drum : 96 mm interval)	1. Run OPC cleaning Mode Print and run the Self-test 2 or 3 times.
2. If faded areas or voids occur in a black image at intervals of 96 mm, or black spots occur elsewhere, the OPC drum surface is damaged.	2. In case of 96 mm interval unremovable in 1, cleanly remove foreign substances stuck on the OPC location equivalent to black spots and white spots with a dry duster.
3. If a black image is partially broken, the transfer voltage is abnormal or the transfer roller's life has expired.	3. The transfer roller guarantees 125,000 sheets printing. If the roller's life is expired, replace it.
	4. In case of 38.5 mm interval unremovable in 1, take measures as to replace the developer cartridge and try to print out.
	5. Clean the inside of the set against the paper particles and foreign matter in order not to cause the trouble.

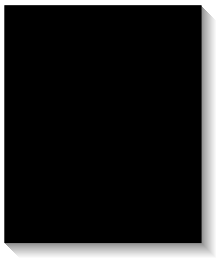
4-2-5 Light Image

• **Description** The printed image is light, with no ghost.

Check and Cause	Solution
1. Develop roller is stained when the toner of developer cartridge is almost consumed.	1. Check if the Toner Save mode is off.
2. Ambient temperature is below than 10°C.	2. No 1 : Replace the developer cartridge and try to print out.
3. Bad contact caused by the toner stains between the high voltage terminal in the HVPS and the one in the set.	3. No 2 : Wait 30 minutes after printer is powered on before you start printing.
4. Abnormal output from the HVPS. (Run self-test and check 1~4)	4. No3 : Clean up the contaminated area by the toner.
	5. Replace the HVPS if the problems are not solved by the above four directions.

4-2-6 Dark Image or a Black

• **Description** The printed image is dark.



Check and Cause	Solution
1. No charge voltage in the engine board. (Perform DCU diagnostic code 01)	1. Clean the high voltage charge terminal.
2. Charge voltage is not turned on due to the bad contacts between power supply in the side of the Developer and charge terminal of HVPS.	2. Check the state of the connector which connects the engine board and HVPS.
	3. Replace the HVPS if not solved by the above direction 1 and 2.

4-2-7 Uneven Density

• **Description** Print density is uneven between left and right.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

Check and Cause	Solution
1. The pressure force on the left and right springs of the transfer roller is not even, the springs are damaged, the transfer roller is improperly installed, or the transfer roller bushing or holder is damaged.	1. Replace both the left and right Spring Holder.
2. The life of the Developer has expired.	2. Occur in the developer cartridge, replace the developer and try to print out.
3. The toner level is not even on the developer roller due to the bad blade.	

4-2-8 Background

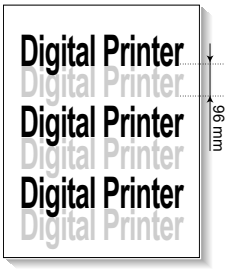
• **Description** Light dark background appears in whole area of the printing.

Digital Printer
Digital Printer
Digital Printer
Digital Printer
Digital Printer

Check and Cause	Solution
1. Recycled recording paper has been used.	1. B/S is not guaranteed when using recycled paper.
2. The life of the Developer has expired.	2. Replace the Developer that has expired.
3. The up-to-down movement of the transfer roller is swift?	3. Clean the busing part of the transfer roller.
4. The HVPS is normal? (Perform DCU diagnostic code 01~04)	4. Replace the Developer if not solved by the above direction 1~3.

4-2-9 Ghost (1)

• **Description** Ghost occurs at 96 mm intervals of the OPC drum in the whole printing.



Check and Cause	Solution
1. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the electrode of the Developer.	1. Clean the terminals when contaminated by toner particles.
2. Bad contacts caused by contamination from toner particles between high voltage terminal in the main body and the one in the HVPS board.	2. Occur in the developer cartridge, replace the developer and try to print out.
3. The life of developer is expired.	3. Replace the engine board if not solved by the above directions 1-2.
4. Transfer roller lifetime(125,000 sheets) has expired.	4. If not solved by the direction 3, check the transfer roller lifetime and replace it.
5. Abnormal low temperature(below 10°C).	5. Wait about 1 hour after power on before using printer.
6. Damaged cleaning blade in the developer.	6. Occur in the developer cartridge, replace the developer and try to print out.

4-2-10 Ghost (2)

• **Description** Ghost occurs at 96 mm intervals of the OPC drum in the whole printing.
(When printing on card stock or transparencies using manual feeder)

Check and Cause	Solution
When printing on card stock thicker than normal paper or transparencies such as OHP, higher transfer voltage is required.	Select 'Thick Mode' on paper type menu from the software application and after using returning to the original mode is recommended.

4-2-11 Ghost (3)

• **Description** White ghost occurs in the black image printing at 51mm intervals.

Check and Cause	Solution
1. The life of the developer may be expired.	1. Occur in the developer cartridge, replace the developer and try to print out.
2. The abnormal voltage and bad contact of the terminal of the supply roller	2. Check the approved voltage of the supply roller and contact of the terminal and adjust if necessary.

4-2-12 Ghost (4)

• **Description** Ghost occurs at 70 mm intervals.

Check and Cause	Solution
The temperature of the fuser is maintained high.	1. Disassemble the fuser and remove the contaminated toner particles on the roller and clean the foreign matter between Thermistor and Heat roller. (⚠ Caution: can be deformed)

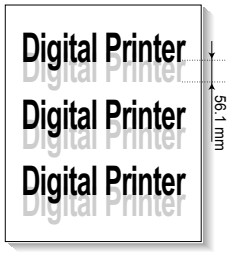
4-2-13 Satins on the Face of Page

• **Description** The background on the face of the printed page is stained.

Check and Cause	Solution
1. Toner leakage due to improperly sealed developer.	1. Replace the developer cartridge.
2. If the transfer roller is contaminated, satins on the face of page will occur.	2. If the transfer roller is contaminated, run PC Cleaning Mode Print 2 or 3 times. And perform Self-Test 2 or 3 times to remove contamination.

4-2-14 Satins on Back of Page

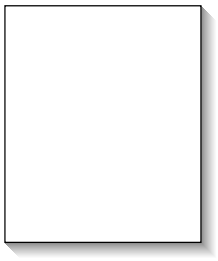
• **Description** The back of the page is stained at 56.1 mm intervals.



Check and Cause	Solution
1. Transfer roller is contaminated.	1. Perform the OPC Cleaning Mode Print 2 or 3 times. Run Self-Test to remove the contamination of the transfer roller.
2. Pressure roller is contaminated.	2. Replace the transfer roller if contaminated severely.
	3. Disassemble the fuser and clean the H/R(Heat Roller) and P/R(Pressure roller). And check the area between H/R and Thermistor. If contaminated, clean the area not to be deformed.

4-2-15 Blank Page Print out (1)

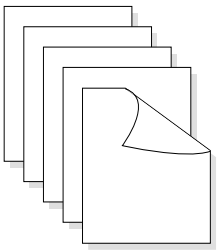
• **Description** Blank page is printed.



Check and Cause	Solution
Bad ground contacts in OPC and/or developer.	Remove contamination of the terminals of the developer and the unit.

4-2-16 Blank Page Print out (2)

• **Description**
1. Blank page is printed.
2. One or several blank pages are printed.
3. When the printer turns on, several blank pages print.



Check and Cause	Solution
1. Bad ground contacts in OPC and/or developer.	1. Remove contamination of the terminals of the developer.
2. Abnormal solenoid.	2. Perform the engine self test using DCU to check if the Solenoid is normal.(refer to code 06)
	3. If not solved by the above directions 1-2, Replace the engine board.
	4. Turn the power off, delete the data of PC and try printing again.

4-3 The cause and solution of the bad discharge

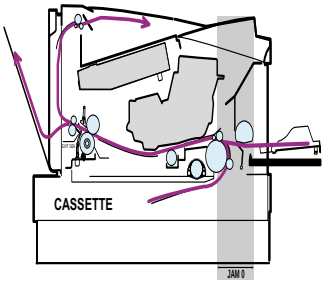
4-3-1 Wrong Print Position

• **Description** Printing begins at wrong position on the paper.

Check and Cause	Solution
Wrong sense time caused by defective feed sensor actuator.	Replace the defective actuator

4-3-2 JAM 0

• **Description**
1. Paper is not exited from the cassette.
2. Jam-0 occurs if the paper feeds into the printer.

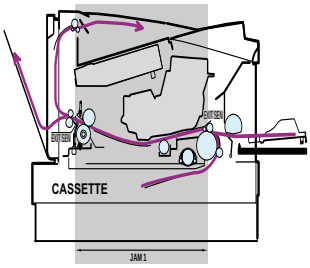


Check and Cause	Solution
1. Check the Solenoid by using DCU diagnostic mode 06.	1. Replace the solenoid.
2. Check if the pad is loose due to bad sealing of the side-pad.	2. Replace the side-pad Assembly L or R, if necessary.
3. Check the surface of the roller-pick-up for foreign matter.	3. Clean with soft cloth dampened with IPA(Isopropyl Alcohol) or water.
4. If continuous clusters occur, check whether the assembly slot between shaft-pickup and housing-pickup become open or is broken away.	4. Replace the Housing-Pickup and/or Shaft-Pickup.
5. If the paper feeds into the printer rand Jam 0 occurs, perform DCU to check feed-sensor of the engine board.	

4-3-3 JAM 1

• Description

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.

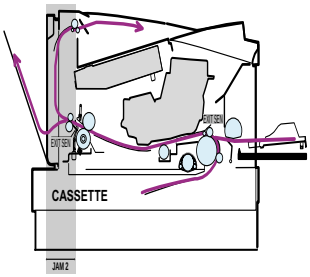


Check and Cause	Solution
1. If the recording paper is jammed in front of or inside the fuser. (Perform DCU diagnostic code of)	1. Replace the SMPS.
2. If the recording paper is stuck in the discharge roller and the fuser just after passing through the Actuator-Feed, Feed Actuator may be defective.	2. Reassemble the Actuator-Feed and Spring-Actuator if the returning is bad.

4-3-4 JAM 2

• Description

1. Recording paper is jammed in front of or inside the fuser.
2. Recording paper is stuck in the discharge roller and in the fuser just after passing through the Actuator-Feed.



Check and Cause	Solution
1. If the paper is completely fed out of the printer, but Jam 2 occurs : Exit sensor is defective. • After the paper is completely discharged, actuator Exit should return to the original position to shut the photo-sensor. Sometimes it takes longer hour than it should and does not return.	1. Check if the exit sensor actuator is defective. • Check if the actuator exit is unformed (Check if the lever part is unformed in shape). • Check whether burrs occur in the assembly part of the actuator exit or not and if the actuator is smoothly operated. • Check if foreign matters and wire get caught in the actuator exit's operation.
2. If the paper is rolled in the Fuser Roller: • This occurs when a Guide claw is broken away or transformed. • It occurs when the Spring of a Guide claw is broken away or transformed. • It occurs when the Heat-Roller or Pressure-Roller is seriously contaminated with the toner.	2. If the paper is stuck in the fuser : disassemble the fuser and remove the jammed paper, and clean the surface of the pressure roller with dry gauze.
3. Paper is accordion in the fuser.	3. Remove the jammed paper after disassembling the fuser : Clean the surface of the pressure roller with dry gauze. • Remove the toner particles stained on the rib. • Check the assemblage and performance of the exit.

4-3-5 Multi-Feeding

• **Description** Multiple sheets of paper are fed at once.

Check and Cause	Solution
1. Solenoid malfunction(the solenoid does not work properly): Perform DCU mode : solenoid check 06.	1. Replace the solenoid if necessary.
2. Pad-Friction is contaminated with foreign matter.(oil...)	2. Clean the pad friction with soft clothe dampened with IPA(Isopropyl Alcohol).
3. The face of paper is blended.	3. Use the smooth paper.

4-3-6 Paper rolled in the fuser

• **Description** If contaminated at intervals of 57mm on the back of a paper.

Check and Cause	Solution
1. Contamination of the pressure roller. (Background, Hot off set)	1. Disassemble the fuser, clean the area between the Heat-roller and Thermistor and remove the foreign matter of the pressure roller. 2. If background appears badly in the printing, fix it by referring to the solutions for background. (See 4-2-8 Background)

4-3-7 OPC

• **Description** Paper is rolled up in the OPC.

Check and Cause	Solution
1. Paper is too much thin.	1. Recommend to use normal paper.
2. The face of paper is curled.	2. How to remove the rolled paper in the OPC. • Remove the paper while turning the OPC against the ongoing direction. • Clean fingerprints on the OPC softly with soft cloth dampened with IPA(Isopropyl Alcohol) or tissue.

4-4 The cause and solution of the malfunction

4-4-1 All LEDs blinking (Fuser Error)

• Description

1. All the lamps on the operator panel blink.
2. Gear of the fuser does not work and breaks away melt away.
   When printing, motor breaks away from its place due to defective fuser gear.

Check and Cause	Solution
1. Check if the thermostat, AC wire and Heat Lamp is open.	1. If the thermostat is open replace the fuser and check following items.
2. Check if the thermistor sensor is in place.	2. If the thermistor sensor device is located deep in the sponge, replace the fuser.
3. Check if the heat lamp works properly.	3. Check if the circuit of overheat mode works properly.
4. Check if the overheat circuit works properly.	4. Run DCU mode : Perform DCU diagnostic code 10.
5. The fuser gear is defective due to melting away.	

4-4-2 All LEDs blinking (Scan Error)

• Description

1. All lamps on the operator panel blink.

Check and Cause	Solution
DCU Mode : Perform DCU diagnostic code 05. If the DCU error code 95 is displayed, replace LSU.	Replace LSU. If you cannot solve the problem after you replace LSU, replace the main board.

4-4-3 Not function of the gear of the fuser due to melting away

• **Description** The motor breaks away from its place due to gear melting away.

Check and Cause	Solution
DCU Mode : Check if the Error States '60' '62' '68' occur. Check the operation of Fuser Erasing Lamp On/Off with the Error Code Check -10-.	1. Replace the Fuser. 2. Replace the Main Control board.

4-4-4 Paper Empty

• **Description** The paper lamp on the operator panel is on even when paper is loaded in the cassette.

Check and Cause	Solution
1. Bending or deformation of the actuator of the paper sensor.	1. Replace the defective actuator.
2. The function of the engine board is defective Perform DCU mode: Perform DCU diagnostic code 8.	2. Replace the engine board.

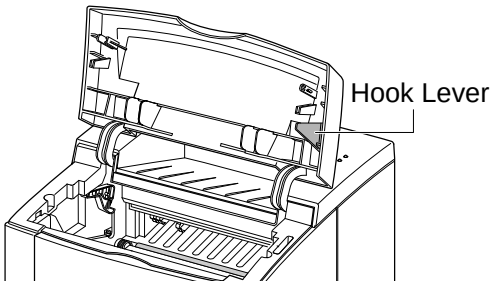
4-4-5 Paper Empty without indication

• **Description** The paper lamp on the operator panel does not come on when the paper cassette is empty.

Check and Cause	Solution
1. Bending or deformation of the actuator of the paper sensor.	1. Replace the defective actuator.
2. The function of the engine board is defective Perform. DCU mode : Perform DCU diagnostic code 8.	2. Replace the engine board.

4-4-6 Cover Open

• **Description** The ERROR lamp is on even when the print cover is closed.

Check and Cause	Solution
1. The hook lever in the top cover may be defective.	1. Replace the hook lever, if defective.
2. Check the connector (CN1 : Engine B'd↔HVPS) and circuit of the cover switch department in the Main Control board. Perform DCU mode : If Error state '64' occurs, Check the related codes of the Cover Open Error.	2. Check the insertion of the Cover Open S/W Connect.
	3. Replace the Main Control board or Cover Open S/W.

4-4-7 No lamp on when the cover is open

• **Description** The ERROR lamp does not come on even when the printer cover is open

Check and Cause	Solution
1. Check the connector(CN8) and circuit of the cover switch department in the Main Control board. Perform DCU mode : If Error state '64' occurs, Check the related codes of the Cover Open Error	1. Check the insertion of the Cover Open S/W Connect.
	2. Replace the Main Control board or Cover Open S/W.

4-4-8 Defective motor operation

• **Description** Main motor is not driving when printing, and paper does not feed into the printer, resulting 'Jam 0'.

Check and Cause	Solution
1. Motor harness or sub PCB may be defective.	1. Check the motor harness, replace it, if defective.
2. Perform DCU diagnostic code 00 and Check the motor operation.	2. Replace the SMPS, if necessary.

4-4-9 No Power

• **Description** When system power is turned on, all lamps on the operator panel do not come on.

Check and Cause	Solution
1. Check if the power input and SMPS output are normal.	1. Replace the power supply cord or SMPS.
2. Check the inferiority of LED-Panel on the front-cover if the LED of Panel does not appear after normal warming-up.	2. Replace the control board. 3. Replace the LED-panel.

4-4-10 Vertical Line Getting Curved

• **Description** When printing, vertical line gets curved.

Check and Cause	Solution
1. If the supply of +24v is unstable in the Main Control board linking with LSU, check drive by DCU Mode: LSU Check -05- LSU Motor on.	1. Replace LSU. 2. Replace the Main Control board.

4-5 Toner Cartridge Service

It is not guaranteed for the default caused by using other toner cartridge other than the cartridge supplied by the Samsung Electronic or caused by non-licensed refill production.

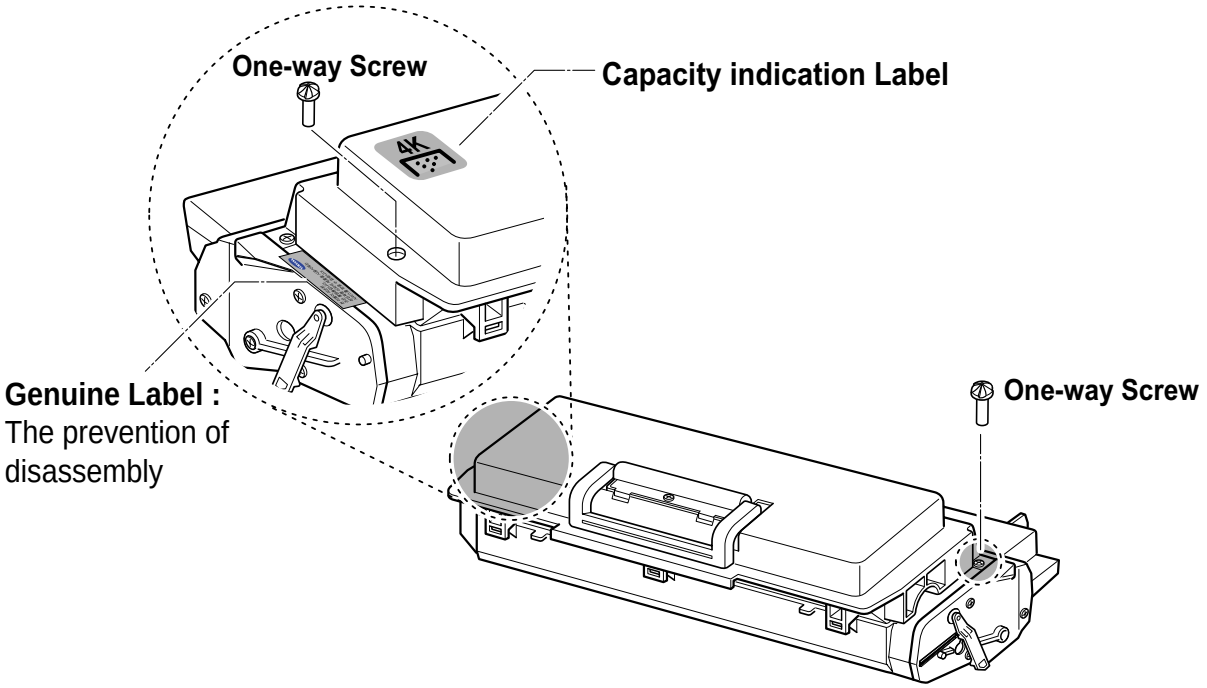
4-5-1 Precautions on Safe-keeping of Toner Cartridge

Excessive exposure to direct light more than a few minutes may cause damage to the cartridge.

4-5-2 Service for the Life of Toner Cartridge

If the printed image is light due to the life of the toner, you can temporarily improve the print quality by redistributing the toner(Shake the toner cartridge), however, you should replace the toner cartridge to solve the problem thoroughly.

4-5-3 Judgment of a genuine Toner Cartridge



4-5-4 Signs and Measures at Poor toner cartridge

Fault	Signs	Cause & Check	Solution
Light image and partially blank image (The life is ended.) 	• The printed image is light or unclean and untidy. • Some part of the image is not printed. • Periodically a noise as "tick tick" occurs.	1. If the image is light or unclean and untidy printed image - Shake the developer and then recheck. (1)NG: Check the weight of the developer (2)OK: Lack of toner, so the life is nearly closed. 2. Some part of image is not printed - Shake the developer and then recheck. (1)NG: Check the weight of the developer and clean the LSU window with a cotton swab, then recheck. (2)OK: Lack of toner, so the life is nearly closed. 3. Periodically a noise as "tick tick" occurs - Measure the cycle and the weight of the developer. 4. White vertical stripes on the whole screen or partly : Check the weight of the developer.	1. All of 1, 2, 3 above- If it become better by shaking, replace with a new developer after 50-100 sheets in the closing state of the life span. 2. In case of 2- If it becomes better after cleaning the LSU window, then the developer is normal. (Because of foreign substance on the LSU window, the image has not been printed partly.) 3. In case of 3- If the cycle of noise is about 2 seconds, the toner inside the developer has been nearly exhausted.(Purchase and replace with a new developer after using about 200 sheets at the point of occurrence) 4. In case of 3- This is a phenomenon caused by lack of toner, so replace with a new developer.
Toner Contamination	• Toner is fallen on the papers periodically. • Contaminated with toner on prints partly or over the whole surface.	1. Toner is fallen on the paper periodically. (1)Check the cycle of the falling of the toner. (2)Check the appearance of both ends of the developer OPC drum. 2.The center of the printed matter is contaminated with toner. (1)Check whether foreign substances or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.	1. If both ends of the OPC drum are contaminated with toner: Check the life of the developer. 2. Check whether it could be recycled. 3. If it cannot be recycled: Replace the developer.

Fault	Signs	Cause & Check	Solution
White Black spot 	• Light or dark black dots on the image occur periodically. • White spots occur in the image periodically.	1. If light or dark periodical black dots occur, this is because the developer rollers are contaminated with foreign substance or paper particles. (1)38.5mm interval : Charged roller (2)96mm interval : OPC cycle 2. If white spots occur in a black image at intervals of 96mm, or black spots occur elsewhere, the OPC drum is damaged or foreign substance is stuck to the surface. 3. If a black and white or graphic image is partially broken at irregular intervals, the transfer roller's life has been expired or the transfer voltage is abnormal.	1. In case of 1 above - Run OPC Cleaning Mode Print 4-5 times repeatedly to remove. Especially check foreign substance on the OPC surface, then remove them with a clean gauze moistened with IPA(Isopropyl Alcohol) not to damage OPC if necessary. ⚠ **Never use usual alcohol.** 2. In case of 2 If they are not disappeared by running OPC Cleaning Mode Print 4-5 times. : at intervals of 38.5mm - Replace the developer. : at intervals of 96mm - Remove foreign substance. : Broken image - Replace the developer according to carelessness. 3. In case of 3 - Exchange the transfer roller because the life of the transfer roller in use has been expired. (Check the transfer voltage and readjust if different.)
Recycled product	• Poor appearance of the developer. • Unclean and rough printouts. • Bad background in the image.	1. Poor appearance of the developer. (1)Check the damage to label and whether different materials are used. (2)Check the appearance of parts of the developer, such as frame, hopper. 2. Unclean and rough printouts. (1)Check whether foreign substance or toner are stuck to the terminal (contact point) of the developer. (2)Check whether the state of the terminal assembly is normal.	1. In case of 1 - (1)If there is an evidence of disassembling the developer. (2)If materials other than normal parts of the developer are added or substituted. 2. In case of 2 - If there are any abnormals in connection with the situation of 1. (1)It occurs when the developer is recycled over 2 times. (2)If toner nearly being expired are collected to use, it is judged as the recycled developer.

Fault	Signs	Cause & Check	Solution
Ghost & Image Contamination	• The printed image is too light or dark, or partially contaminated black. • Totally contaminatedblack. (Black image printed out) • The density of printouts is too dark and ghost occurs.	1. The printed image is too light or dark, or partially contaminated black. (1)Check whether foreign substance or toner are stuck to the terminal(point of contact) of the developer. (2)Check whether the terminal assembly is normal.	1. All of 1, 2, 3 above (1)Remove toner and foreign substances adhered to the contact point of the developer. (2)The contact point of the unit facing that of the developer also must be cleaned. (3)If the terminal assembly is unsafe: • Fully stick the terminal to or reassemble it after disassembling. • Disassemble the side plate and push the terminal to be stuck, then reassemble it.
		2. Totally contaminated black. (Black image printed out) (1)Check whether foreign substances are stuck to the terminal(point of contact) of the developer and the state of assembly. (Especially check the charged roller terminal.)	2. In case of 2 It is a phenomenon when the OPC drum of the developer is not electrically charged. Clean the terminals of the charged roller, then recheck it.
		3. The printed image is dark and ghost occurs. (1)Check foreign substance attached to the terminal (point of contact) of the developer and the state of assembly. (Especially check the developing roller terminal.)	3. In case of 3 It is a phenomenon as the developing bias voltage of the developer. Clean the terminals of the developing roller, then recheck it.

4-6 The cause and solutions of bad environment of the software

4-6-1 The printer is not working (1)

• **Description** While Power turned on, the printer is not working in the printing mode.

Check and Cause	Solution
1. Run Self-Test Mode: Turn the power on while pressing the test printing button for 2 or 3 seconds before printing works.	1.Check the power of the printer and perform the Self-Test. If the test printing works, that means no problems in the printer itself. If the test printing does not work, that means bad functioning of the printer(not because of software). Perform DCU to check the Error Status.
2. Check if the PC and the printer is properly connected and the toner cartridge installed.	2. Replace the printer cable. If the problems not solved even after the cable replaced, check the amount of the remaining tone. (refer to Toner Cartridge Service 4-5)
3. Printing is nor working in the Windows.	3. Check if the connection between PC and printer port is proper. If you use windows, check if the printer driver in the controller is set up. If the printer driver is properly set up, check in which program the printing is not working. The best way to find out is to open the memo pad to check the function of printing. If it is not working in a certain program, adjust the setup the program requires. Sometimes, the printout is normal within the Windows basic programs, but it's not working in a particular program. In such case, install the new driver again. If not working in the Windows basic program, Check the setup of the port of CMOS is on ECP. And check the address of IRQ 7 and 378
4. Check if the printer cable is directly connected to peripheral devices	4. If the scanner needs to be connected to the printer, first the remove the scanner from the PC to see if the printer is properly working alone.

4-6-2 The printer is not working (2)

• Description	After receiving the printing order, no response at all or the low speed of printing occurs due to wrong setup of the environment rather than malfunction of the printer itself.

Check and Cause	Solution
1. Secure more space of the hard disk.	1. Not working with the message 'insufficient printer memory' means hard disk space problem rather than the RAM problem. In this case, provide more space for the hard disk. Secure more space using the disk utilities program.
2. Printing error occurs even if there is enough space in the hard disk.	2. The connection of the cable and printer port is not proper. Check if the connection is properly done and if the parallel port in CMOS is rightly set up.
3. Check the parallel-port-related items in the CMOS Setup.	3. As a printer port, Select ECP or SPP among SPP(Normal), ECP, and EPP modes(increase printing speed) SPP normal mode support 8-bit data transfer, while ECP Mode transfer the 12-bit data.
4. Reboot the system to print.	4. If the regular font is not printing, the cable or the printer driver may be defective. Turn the PC and printer off, and reboot the system to print again. If not solved, double-click the printer in my computer If the regular fonts are not printed this time again. the cable must be defective so replace the cable with new one.

4-6-3 Abnormal Printing

• **Description**	The printing is not working properly even when the cable has no problem. (even after the cable is replaced) If the printer won't work at all or the strange fonts are repeated, the printer driver may be defective or wrong setup in the CMOS Setup.

Check and Cause	Solution
1. Set up the parallel port in the CMOS SETUP.	1. Select SPP(Normal) or ECP LPT Port the among ECP, EPP or SPP in the CMOS Setup.
2. Printer Driver Error.	2. Check the printer in My Computer.(to see if the printer driver is compatible to the present driver or delete the old driver, if defective and reinstall the new driver)
3. Error message from insufficient memory. (The printing job sometimes stops or due to insufficient virtual memory, but it actually comes from the insufficient space of the hard disk.)	3. Delete the unnecessary files to secure enough space of the hard disk and start printing job again.

4-6-4 SPOOL Error

• Description	To spool which stands for "simultaneous peripheral operations online" a computer document or task list (or "job") is to read it in and store it, usually on a hard disk or larger storage medium so that it can be printed or otherwise processed at a more convenient time (for example, when a printer is finished printing its current document).

Check and Cause	Solution
1. Insufficient space of the hard disk in the directory assigned for the basic spool.	1. Delete the unnecessary files to provide more space to start printing job.
2. If the previous printing error not solved.	2. If there are some files with the extension name of ****.jnl, Delete them and Reboot the Windows to restart printing job.
3. When expected to collide with other program.	3. Shut down all other programs except the current one, if possible.
4. When an application program or the printer driver is damaged.	4. Delete the printer driver completely and reinstall it.
5. When some files related to OS are damaged or virus infected.	5 After rebooting the computer, check for viruses, restore the damaged files and reinstall the program to do the printing job.
6. Memory is less than suggested one.	6. Add up enough memory to the PC.

⚠ How to delete the data in the spool manager.

In the spool manager, the installed drivers and the list of the documents waiting to be printed are shown. Select the document to be deleted and check the delete menu.

If you intend to delete the current document being printed, the data being transferred to the printer will be put out and then the document is removed. Before choosing the document, the menu is still inactive.

Or put the document out of the list and repeat the routine as in the above or finish the spool manager.

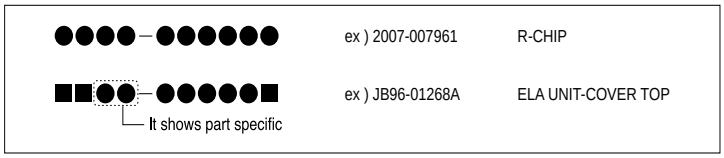
5. Exploded Views and Parts List

- **Deal drawings and service parts are declared for the items with higher rate of inferiority and replaceable in the level of service description only.**
- **If inferiority occurs, you can replace the parts by the unit declared in deal drawings and service items.**

Way to observe Part Code & Description

Part code and Description is quoted and controlled by determined standard. Refer to this determined standard, it will help with ordering Part.

• There are two kinds of Part code inscription type.



(● : figure, ■ : character (alphabet))

Type 1 : Controlled by Company : It can be commonly used for all kinds of product SEC produce. Mostly, electronics Parts.

Type 2 : Controlled by Division : It is used or one produce. Mostly, Mostly, mechanical Parts.

• A/S privately used part : It is only used for A/S **.**

• Ass'y part : Assembled by more than 2 Parts. If necessary part is not A/S Part, Ass'y part including necessary par can be used. It is shown in the diagram and drawing of SVC manual.

• Ass'y part and A/S privately used Part is distinguished by part Code and Description. The are inscription type 2. It is recognized by Part character and front side of description.

DIVISION	PART CODE	DESCRIPTION
A/S Private	**81-****** (JB81-00039A)	AS-***** (AS-USE)
ASS'Y Part	**75-****** (JB75-00068A)	MEC-***** (MEC-CHUTE)
ASS'Y Part	**92-****** (JB92-01131A)	PBA ****** (PBA MAIN-CONTROLLER)
ASS'Y Part	**97-****** (JB97-01089A)	MEA ****** (MEA UNIT-PULLEY IDLE)

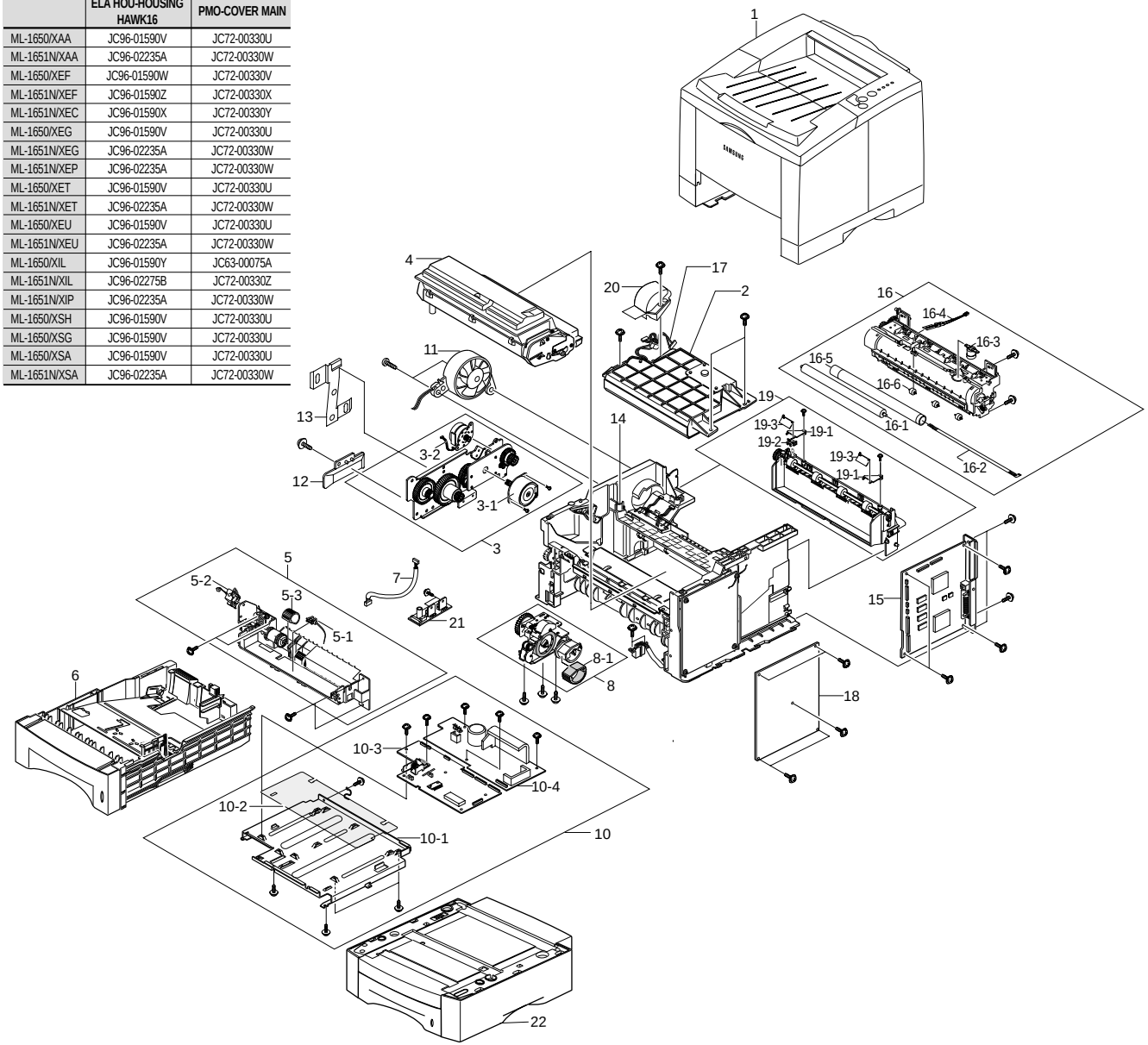
5-1 Exploded Views and Parts List

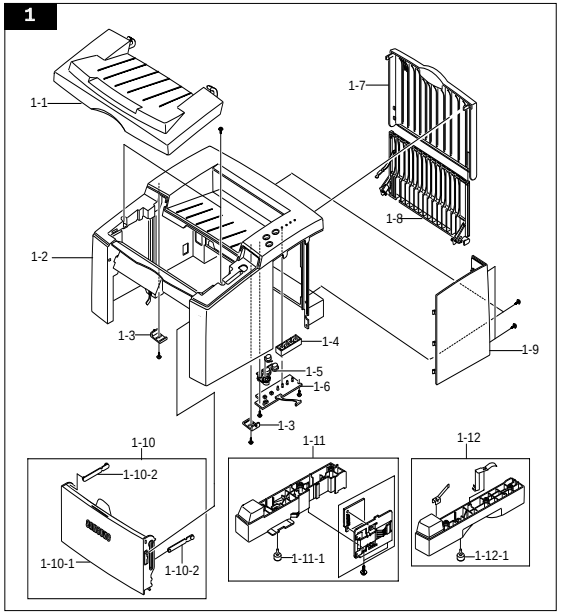
• Service Parts List

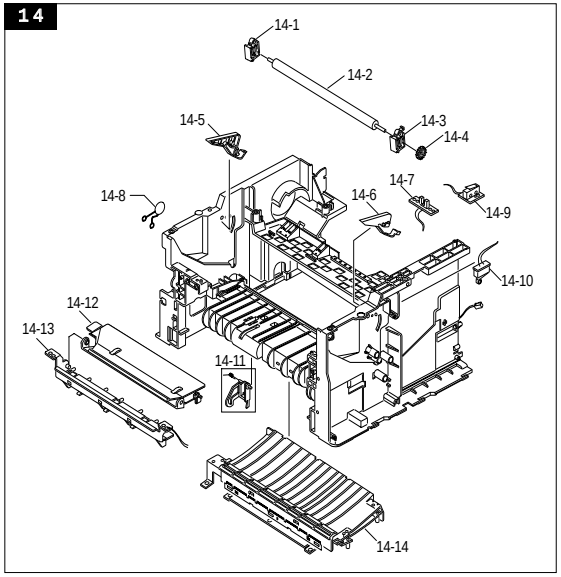
NO.	DESCRIPTION	SEC CODE	Q'TY	SA	REMARK
1	ELA HOU-HOUSING HAWK16	refer to the table	1	O	
1-1	PMO-COVER OPEN	JC72-00628A	1	O	
1-2	PMO-COVER MAIN	refer to the table	1	O	
1-3	PMO-STOPPER HINGE OPEN	JC72-00482A	2	O	
1-4	PMO-LENS LED	JC72-00365A	1	O	
1-5	PMO-KEY BUTTON	JC72-00499A	1	O	
1-6	PBA SUB-PANEL_SEC	JC92-01208D	1	O	
1-7	PMO-COVER REAR	JC72-00355A	1	O	
1-8	PMO-STACKER REAR	JC72-00356A	1	O	
1-9	PMO COVER CONTROLLER	JC72-00358A	1	O	
1-10	MEA UNIT-MP TRAY	JC97-01325A	1	O	
1-10-1	PMO-COVER-MP	JC72-00349A	1	O	
1-10-2	PMO-TRAY LINK MP	JC72-00350A	2	O	
1-11	MEA UNIT-BRKT BOTTOM(L)	JC97-01315C	1	O	
1-11-1	FOOT-RUBBER	JC61-40001A	1	O	
1-12	MEA UNIT-BRKT BOTTOM(R)	JC97-01316A	1	O	
1-12-1	FOOT-RUBBER	JC61-40001A	1	O	
2	UNIT-LSU(M)	JC59-00013A	1	O	
3	ELA UNIT-MOTOR 16	JC96-02057A	1	O	
3-1	MOTOR-STEP 7.5_DEG	JC31-00002A	1	O	
3-2	MOTOR-STEP	JC31-00009A	1	O	
4	ELA UNIT-DEVE	*	1	X	
5	ELA HOU-MPF	JC96-01650A	1	O	
5-1	PHOTO-INTERRUPTER	0604-001095	1	O	
5-2	SOLENOID-HAWK	JC33-00003A	1	O	
5-3	RPR-RUBBER P/UP, MP	JC73-10907A	1	O	
6	MEA UNIT-FEEDER CST 500	JC97-01466C	1	O	550 SHEETS
7	CBF HARNESS-MOTOR	JC39-00157A	1	O	
8	MEA UNIT-FEEDER	JC97-01324A	1	O	
8-1	RMO-RUBBER PICK_UP	JC73-40907A	1	O	
9	PMO-CAP SENSOR	JC72-00320A	1	O	
10	ELA HOU-ENGINE	JC96-02113A	1	O	⚠ 110V
	ELA HOU-ENGINE	JC96-02114A	1	O	⚠ 220V
10-1	SHIELD-PCU	JC70-00080A	1	O	
10-2	PCT-INSULATOR PCU	JC72-00334A	1	O	
10-3	PBA MAIN-ENGINE	JC92-01302A	1	O	⚠110V/220V
10-4	PWB-HAWK 16 SMPS	JC44-00021A	1	O	⚠ 110V
	PWB SMPS V2(220V)	JC44-00022A	1	O	⚠ 220V
11	FAN-DC	JC31-00012A	1	O	
12	PMO-CAP-WIRE	JC72-00656A	1	O	
13	IPR-CLAMP EMI	JC70-00009A	1	O	
14	ELA UNIT-FRAME BASE HAWK16	JC96-01641J	1	O	⚠ 110V
	ELA UNIT-FRAME BASE HAWK16	JC96-01641K	1	O	⚠ 220V
14-1	ELA UNIT-HOLDER TR L	JC96-01730A	1	O	
14-2	MEC-ROLLER TRANSFER	JC75-00124A	1	O	
14-3	ELA UNIT-HOLDER TR R	JC96-01729A	1	O	
14-4	GEAR-TR29	JC66-00039A	1	O	
14-5	ELA UNIT-GUIDE DEVE L	JC96-01643A	1	O	
14-6	ELA UNIT-GUIDE DEVE R	JC96-01642A	1	O	
14-7	PBA SUB-EXIT SENSOR	JC92-01234B	1	O	
14-8	ELA HOU-VARISTOR	JC96-01772A	1	O	
14-9	PBA SUB-FUSER SW	JC92-01261A	1	O	
14-10	PBA SUB-SWITCH	JC92-01235A	1	O	
14-11	ELA UNIT-EMPTY_ACT HAWK	JC96-01720A	1	O	
14-12	ELA UNIT-GUIDE FEED XRX 16	JC96-01653D	1	O	
14-13	ELA UNIT-PTL XRX 16	JC96-02126A	1	O	
14-14	ELA UNIT-GUIDE TRANSFER	JC96-01645A	1	O	
15	PBA MAIN-CONTROLLER	JC92-01353A	1	O	
16	ELA UNIT-FUSER	JC81-00394A	1	O	⚠110V
	ELA UNIT-FUSER	JC81-00393A	1	O	⚠220V
16-1	MEC-ROLLER PRESSURE	JC75-00114A	1	O	
16-2	LAMP-HALOGEN	4713-001155	1	O	⚠110V
	LAMP-HALOGEN	4713-001156	1	O	⚠220V
16-3	THERMOSTAT	4712-000001	1	O	
17	CBF HARNESS-LSU	JC39-00135A	1	O	
18	SMPS-HVPS	JC44-00027A	1	O	
19	MEA RACK-HOU EXIT	JC97-01338J	1	O	Only 1650/XIL
	MEA RACK-HOU EXIT	JC97-01338K	1	O	
19-1	PMO-HOLDER LEVER	JC72-00631A	1	O	
19-2	PHOTO INTERRUPTER	0604-001095	1	O	
19-3	PMO-LEVER STACKING	JC72-41188F	1	O	
20	PMO-DUCT FAN2	JC72-00627A	1	O	
21	PBA MAIN-MOTOR JOINT	JC92-01310A	1	O	
22	MEA RACK-CAST SCF-110V	*	1	X	

O : Service available **X** : Service not available

	ELA HOU-HOUSING HAWK16	PMO-COVER MAIN
ML-1650/XAA	JC96-01590V	JC72-00330U
ML-1651N/XAA	JC96-02235A	JC72-00330W
ML-1650/XEF	JC96-01590W	JC72-00330V
ML-1651N/XEF	JC96-01590Z	JC72-00330X
ML-1651N/XEC	JC96-01590X	JC72-00330Y
ML-1650/XEG	JC96-01590V	JC72-00330U
ML-1651N/XEG	JC96-02235A	JC72-00330W
ML-1651N/XEP	JC96-02235A	JC72-00330W
ML-1650/XET	JC96-01590V	JC72-00330U
ML-1651N/XET	JC96-02235A	JC72-00330W
ML-1650/XEU	JC96-01590V	JC72-00330U
ML-1651N/XEU	JC96-02235A	JC72-00330W
ML-1650/XIL	JC96-01590Y	JC63-00075A
ML-1651N/XIL	JC96-02275B	JC72-00330Z
ML-1651N/XIP	JC96-02235A	JC72-00330W
ML-1650/XSH	JC96-01590V	JC72-00330U
ML-1650/XSG	JC96-01590V	JC72-00330U
ML-1650/XSA	JC96-01590V	JC72-00330U
ML-1651N/XSA	JC96-02235A	JC72-00330W



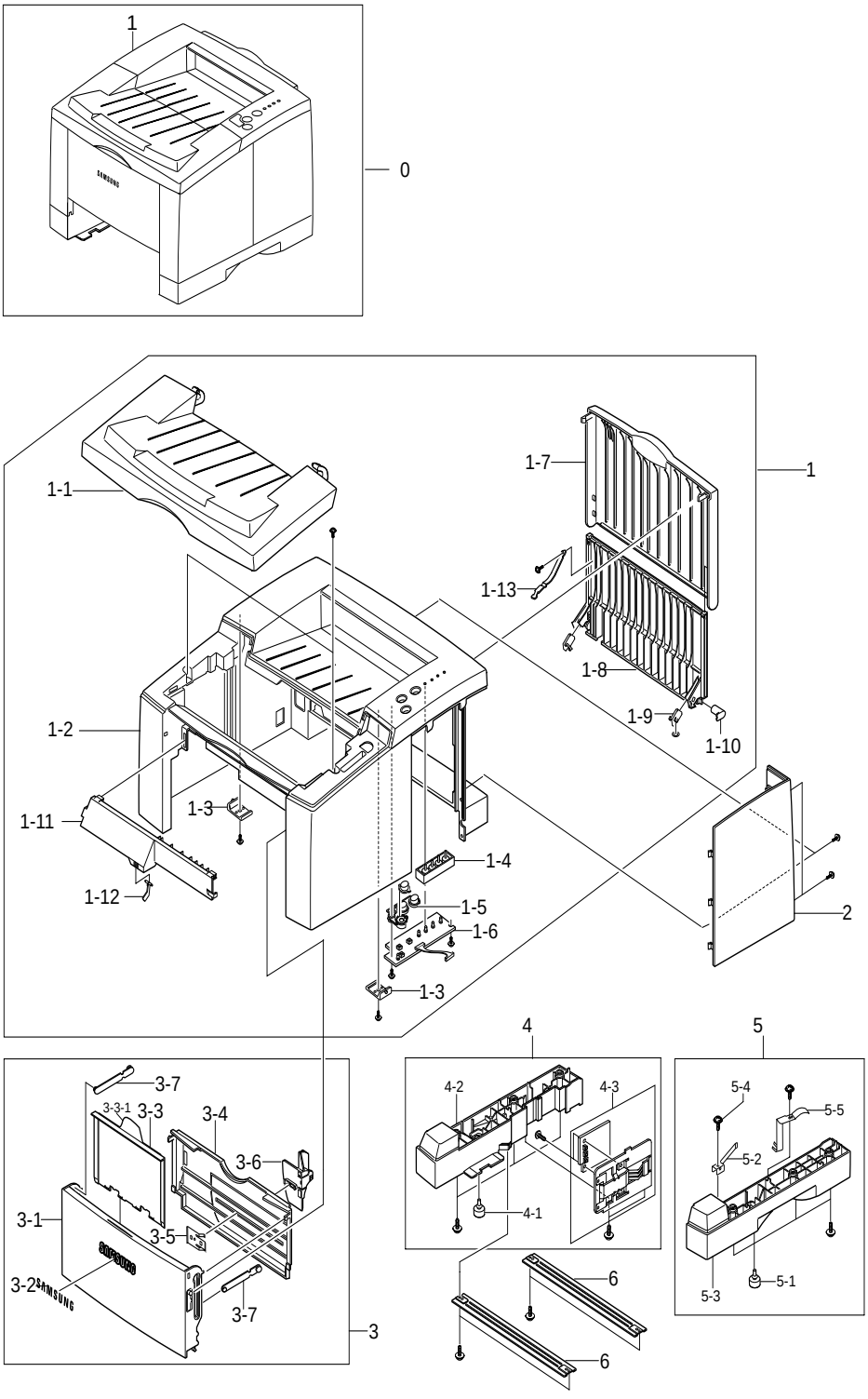




5-2 All Exploded Views and Parts List

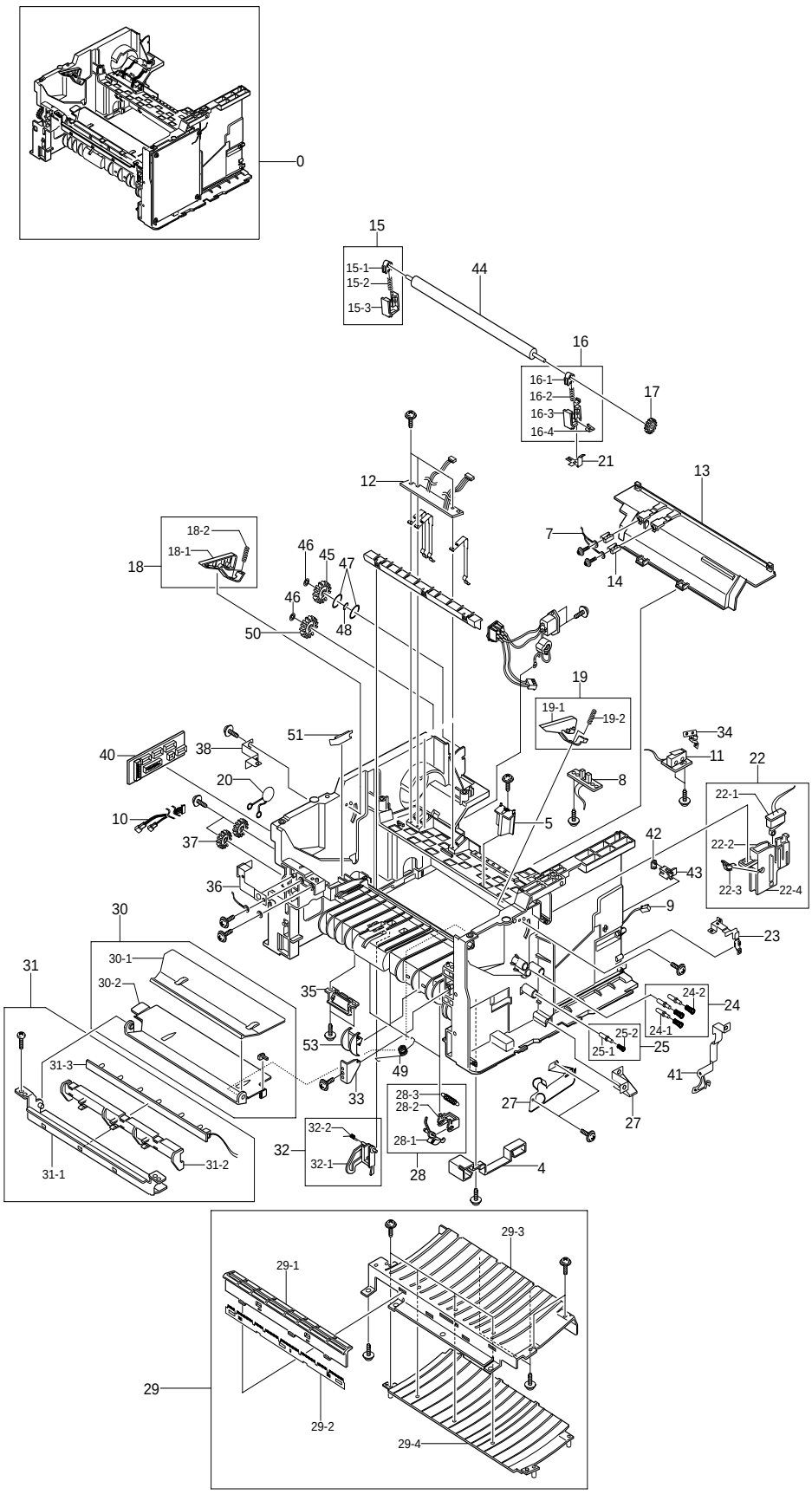
5-2-1 Cover Exploded View

NO.	DESCRIPTION	Q'TY
0	ELA HOU-COVER MAIN	1
1		
1-1	PMO-COVER OPEN	1
1-2	PMO-COVER MAIN	1
1-3	STOPPER HINGE OPEN	2
1-4	PMO-LENS LED	1
1-5	PMO-KEY BUTTON	1
1-6	PBA PANEL	1
1-7	PMO-COVER REAR	1
1-8	PMO-STACKER REAR	1
1-9	IPR-SPRING LOCKER REAR	2
1-10	PMO-CAP REAR	1
1-11	PMO-SUPPORT MP TRAY	1
1-12	PMO-LEVER_EMPTY, MP	1
1-13	PMO-STOPPER_EXIT,P	1
2	PMO COVER CONTROLLER	1
3	MEA UNIT-MP TRAY	1
3-1	PMO-COVER-MP	1
3-2	MPR-NAME PLATE XRX	1
3-3	PMO-CHUTE	1
3-3-1	PMO-DUMMY CHUTE	1
3-4	PMO-TRAY HOLDER MP	1
3-5	IPR-GUIDE LATCH	1
3-6	PMO-SIDE GUIDE MP	1
3-7	PMO-TRAY LINK MP	2
4	MEA UNIT-BRKT BOTTOM(L) XRX	1
4-1	FOOT-RUBBER	1
4-2	PMO-BRKT BASE L	1
4-3	PAPER SIZE SENSOR ASS'Y	1
5	MEA UNIT-BRKT BOTTOM(R) XRX	1
5-1	FOOT-RUBBER	1
5-2	IPR-PLATE CST GUIDE	1
5-3	PMO-BRKT BASE R	1
5-4	SCREW-TAPTITE	1
5-5	IPR-GROUND SCF BASE	1
6	IPR-BAR CLOSS BOTTOM	2
S1	SCREW-TAPTITE	7



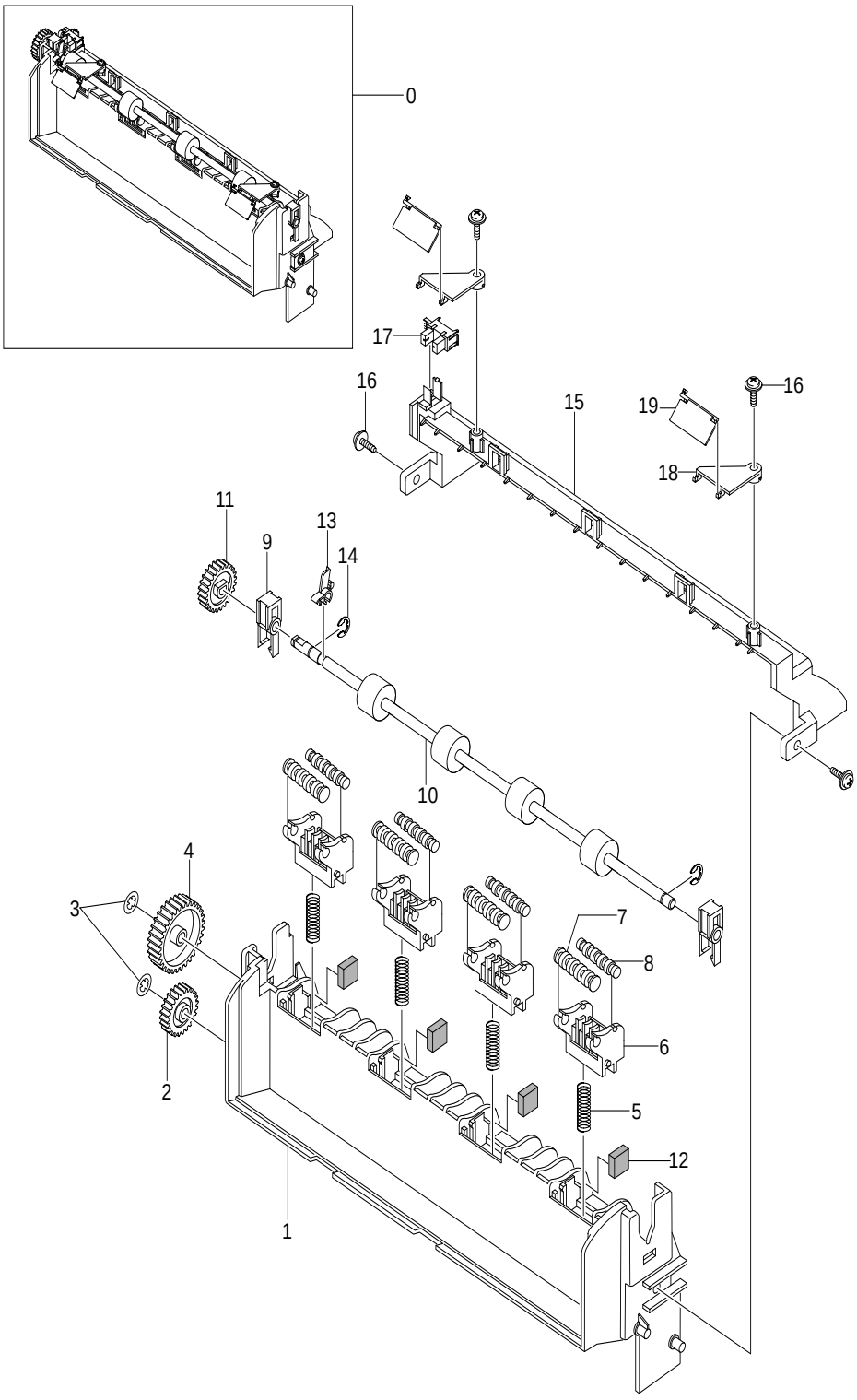
5-2-2 Frame Exploded View

NO.	DESCRIPTION	Q'TY
1	ELA UNIT-FRAME BASE	1
2	PMO-GUIDE RIB	1
3	CBF HARNESS-INLET ASS'Y	1
4	PMO-HOLDER WIRE	1
5	KEY DEVE	1
6	CBF HARNESS-ENGINE_CONTROL	1
7	CBF-HARNESS_FUSER	1
8	PBA-EXIT SENSOR	1
9	CBF-HARNESS-THERMISTOR JOINT	1
10	CBF-HARNESS-MP_CLUTCH ENG	1
11	PBA SUB-FUSER SW	1
12	PBA SUB-TONER SENSOR	1
13	PMO-FRAME COVER	1
14	IPR-TERMINAL FU	2
15	ELA UNIT-HOLDER TR L	1
15-1	PMO-BUSHING TR	1
15-2	SPRING TR L	1
15-3	PMO-TRANSFER HOLDER	1
16	ELA UNIT-HOLDER TR R	1
16-1	PMO-BUSHING TR	1
16-2	SPRING TR R	1
16-3	PMO-TRANSFER HOLDER	1
16-4	IPR-PLATE TR	1
17	GEAR-TR29	1
18	ELA UNIT-GUIDE DEVE L	1
18-1	PMO-GUIDE DEVE L	1
18-2	SPRING GUIDE DEVE	1
19	ELA UNIT-GUIDE DEVE R	1
19-1	PMO-GUIDE DEVE R	1
19-2	SPRING GUIDE DEVE	1
20	ELA HOU-VARISTOR	1
21	IPR-TERMINAL TR, HAWK	1
22	ELA UNIT-SENSOR DEVE	1
22-1	PBA -MICROSWITCH	1
22-2	PMO-HOLDER ACTUATOR	1
22-3	PMO-ACTUATOR DEVE	1
23	GROUND FU	1
24	ELA UNIT-TERMINAL TR L	1
24-1	ICT-SHAFT HV LARGE	1
24-2	SPRING-HV LARGE	1
25	ELA UNIT-TERMINAL TR S	3
25-1	ICT-SHAFT HV LARGE	3
25-2	SPRING-HV SMALL	3
26	GROUND-HVPS	1
27	IPR-REMOVE KEY	1
28	ELA UNIT-ACTUATOR FEED	1
28-1	PMO-ACTUATOR FEED	1
28-2	PMO-HOLDER ACTUATOR	1
28-3	SPRING-FEED HAWK 14	1
29	ELA UNIT-GUIDE TRANSFER	1
29-1	PMO-HADER SAW PLATE	1
29-2	IPR-PLATE SAW	1
29-3	IPR-GUIDE TRANSFER	1
29-4	PMO-GUIDE RIB TR	1
30	ELA UNIT-GUIDE FEED	1
30-1	PMO-GUIDE OPTIC	1
30-2	GUIDE FEED	1
30-3	PMO-HOLDER G/PAPER	1
31	ELA UNIT-PTL	1
31-1	GUIDE PLATE FEED	1
31-2	PMO-HOLDER PTL	1
31-3	PBA SUB-PTL	1
32	ELA UNIT-EMPTY ACT	1
32-1	PMO-ACTUATOR EMPTY HAWK	1
32-2	SPRING EMPTY	1
33	HINGE GUIDE FEED	1
34	GND ICU	1
35	PMO-CAP SENSOR	1
36	GND MP	1
37	GEAR-P/UP DRIVE	2
38	GROUND MOTOR	1
39	IPR-GUIDE DUST	1
40	PBA MAIN-CON_JOINT	1
41	IPR-OPC-HAWK	1
42	CAP CONNECTOR L	1
43	CAP CONNECTOR U	1
44	MEC-ROLLER TRANSFER	1
45	GEAR IDLE Z27	2
46	RING-CS	2
47	WASHER-PLAIN	2
48	IPR-WASHER SPRING SU	1
49	SPRING HINGE FEED	1
50	GEAR-EXIT M ID	1
51	IPR-GUIDE, DUST	1
52	PMO-BASE, FRAME	1
53	PMO-GUIDE-SKEW(12)	1



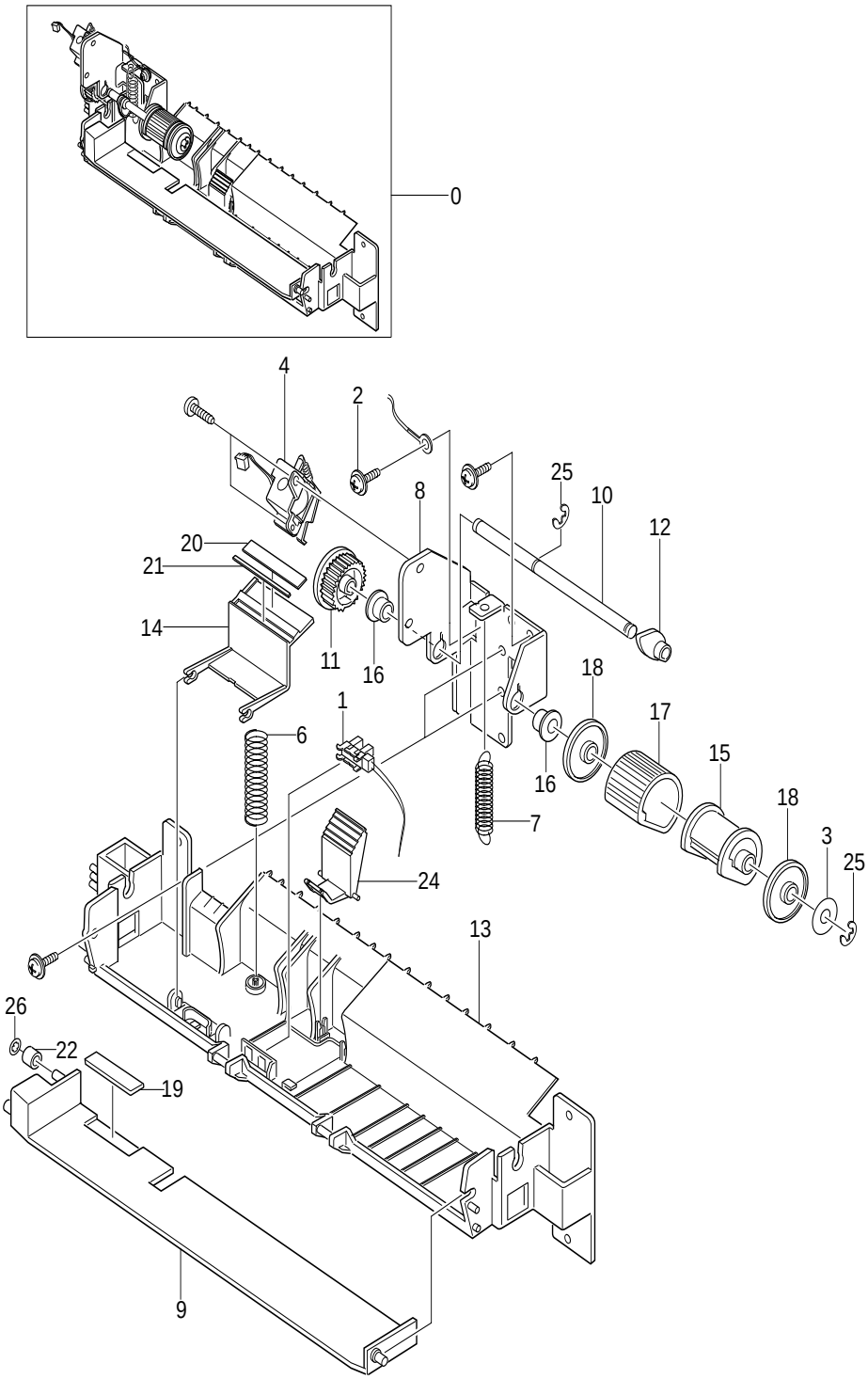
5-2-3 Exit Exploded View

NO.	DESCRIPTION	Q'TY
0	MEA RACK-HOU EXIT	1
1	PMO-FRAME REAR	1
2	GEAR-EXIT/U, ID	1
3	RING-CS	2
4	GEAR-IDLE 25	1
5	SPRING-F/DOWN	4
6	PMO-HOLDER EXIT_F/DOWN	4
7	PMO-ROLLER-EXIT, MAIN	4
8	PMO-ROLLER-EXIT, FR	4
9	MEC-BEARING, EXIT RING-C	2
10	MEA UNIT-ROLL EXIT	1
11	GEAR-EXIT	1
12	RMP-RUBBER EXIT_F/UP	4
13	ACTUATOR OUT-FULL	1
14	MEC-BEARING, EXIT RING-C	2
15	GUIDE EXIT	1
16	SCREW TAPTITE	4
17	PHOTO SENSOR OUT BIN	1
18	PMO-HOLDER LEVER	2
19	PMO-LEVER STACKING	2

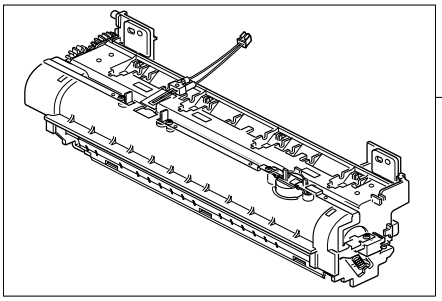


5-2-4 Rack-MPF Exploded View

NO.	DESCRIPTION	Q'TY
0	ELA HOU-MPF	1
1	PHOTO-INTERRUPTER	1
2	SCREW-TAPTITE	2
3	WASHER-PLAIN	1
4	SOLENOID-HAWK	1
5	CBF-HARNESS-MP_EMPTY	1
6	SPRING KNOCK UP	1
7	SPRING-PICK UP, MP	1
8	BRACKET_MP	1
9	PMO-PLT KNOCK_UP, MP	1
10	ICT-SHAFT_P/U, MP	1
11	PMO-GEAR P/U MP	1
12	PMO-CAM PICK UP MP	1
13	PMO-FRAME_MP	1
14	PMO-HOLDER_P/U,MP	1
15	PMO-HOUSING_P/U, MP	1
16	PMO-BEARING-PICK UP	2
17	RPR-RUBBER P/UP, MP	1
18	PMO-IDLE PICK UP, MP	2
19	RPR-PAD KNOCKUP, MP	1
20	RCR-FRICTION PAD 1 MP	1
21	RCR-FRICTION PAD 2 MP	1
22	PMO-RING KNOCK UP MP	1
23	SCREW TAPTITE	2
24	PMO-ADJUST END MP	1
25	RING-E	1
26	RING-CS	1



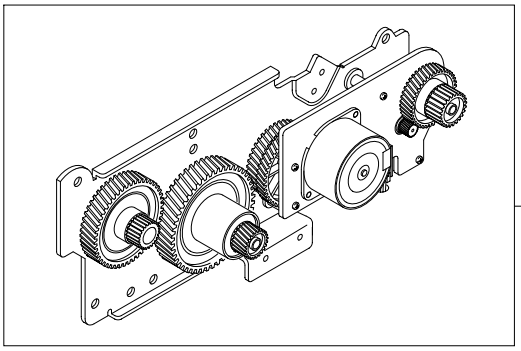
5-2-5 Fuser Exploded View

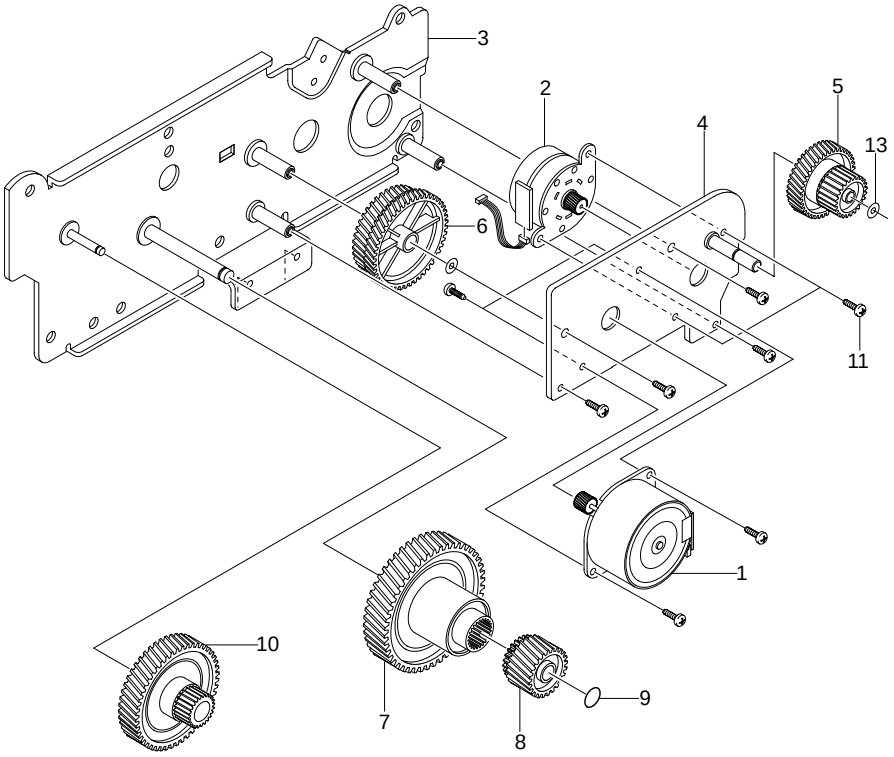


NO.	DESCRIPTION	Q'TY
0	ELA UNIT FUSER (110V)	1
	ELA UNIT FUSER (220V)	1
1	SCREW TAPTITE M3 x 8, BH+	1
2	SCREW TAPTITE M3 x 10, FH+	1
3	SCREW MACHINE M3 x 6	2
4	THERMISTOR-NTC	1
5	ELECTRODE FU R	1
6	ELECTRODE FU M	1
7	ELECTRODE FU L	1
8	THERMOSTAT	1
9	BRKT GEAR FUSER	1
10	GEAR-IDLE 25	1
11	GEAR-IDLE 15	1
12	RING-CS	2
13	COVER FUSER	1
14	ROLLER EXIT_F/UP	3
15	EXIT_F/UP (SPRING)	3
16	SPRING-CLAW	4
17	GUIDE-CLAW	4
18	LAMP-HALOGEN(110V)	1
	LAMP-HALOGEN(220V)	1
19	ROLLER-HEAT	1
20	ROLLER PRESSURE	1
21	FRAME FUSER	1
22	GUIDE INPUT	1
23	GEAR FUSER, 32	1
24	BUSHING HR-L	1
25	BUSHING HR-R	1
26	SPRING-BEARING PR	2
27	BUSHING PR	2
28	PMO GUIDE REAR	1
29	SHAFT EXIT_F/UP	1
30	BUSHING_TX	3
31	GEAR-EXIT	1
32	RUBBER EXIT	3
33	RUBBER EXIT F/UP	1
34	ACTUATOR EXIT	1
35	SPRING-ACTUATOR	1
36	HOLDER BRUSH	1
37	BRUSH ANTISTATIC	1
38	HOLDER SHAFT	1

5-2-6 Drive Exploded View

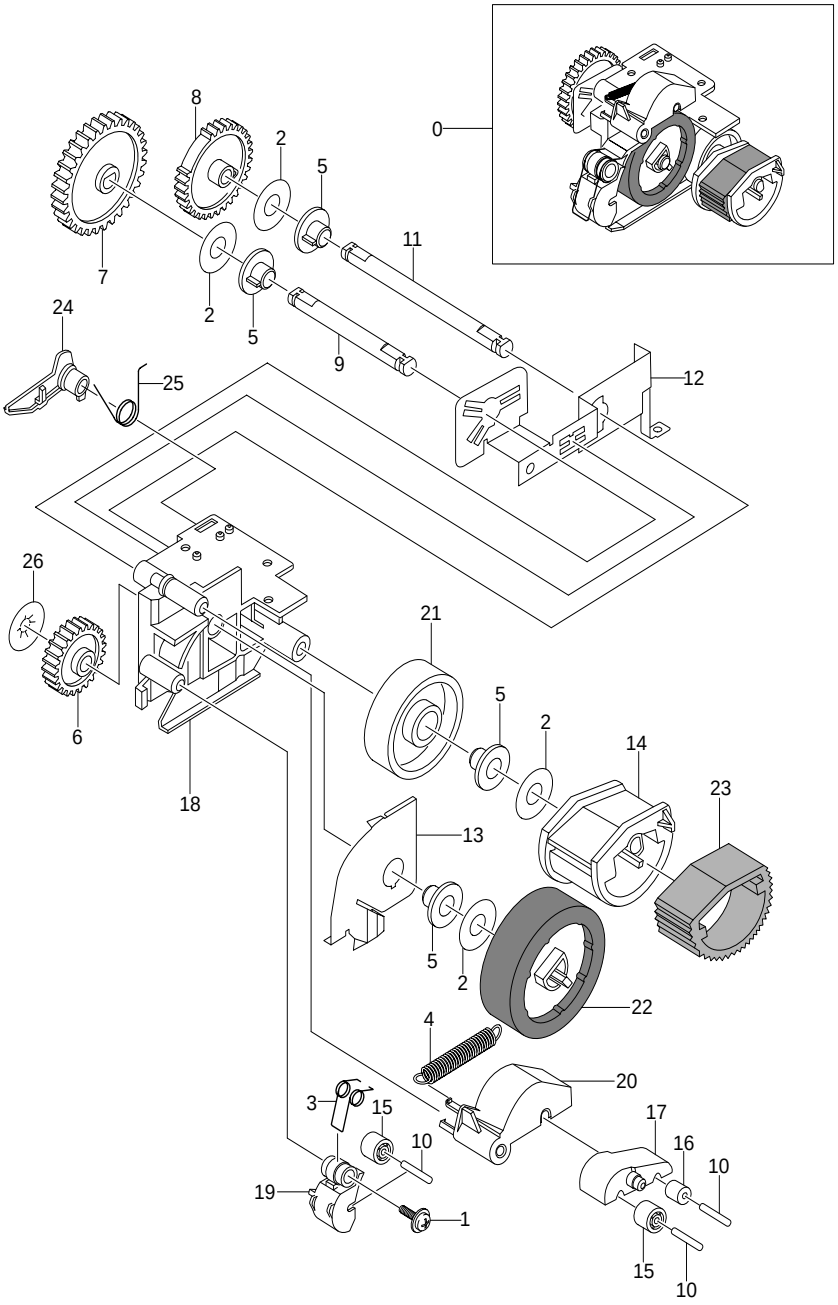
NO.	DESCRIPTION	Q'TY
0	ELA UNIT-MOTOR	1
1	MOTOR-STEP 7.5_DEG	1
2	MOTOR-STEP 7.5_DEG	1
3	IPR-BRKT GEAR	1
4	IPR-BRKT MOTOR	1
5	GEAR-FUSER DRV	1
6	GEAR-RDCN 123-87	1
7	GEAR-OPC DRV 135	1
8	GEAR-OPC DRIVE2	1
9	WASHER-PLAIN	1
10	GEAR-FEED DRV	1
11	SCREW-MACHINE	8
12	MPR-POLYWASHER8	1
13	WASER-PLAIN	1





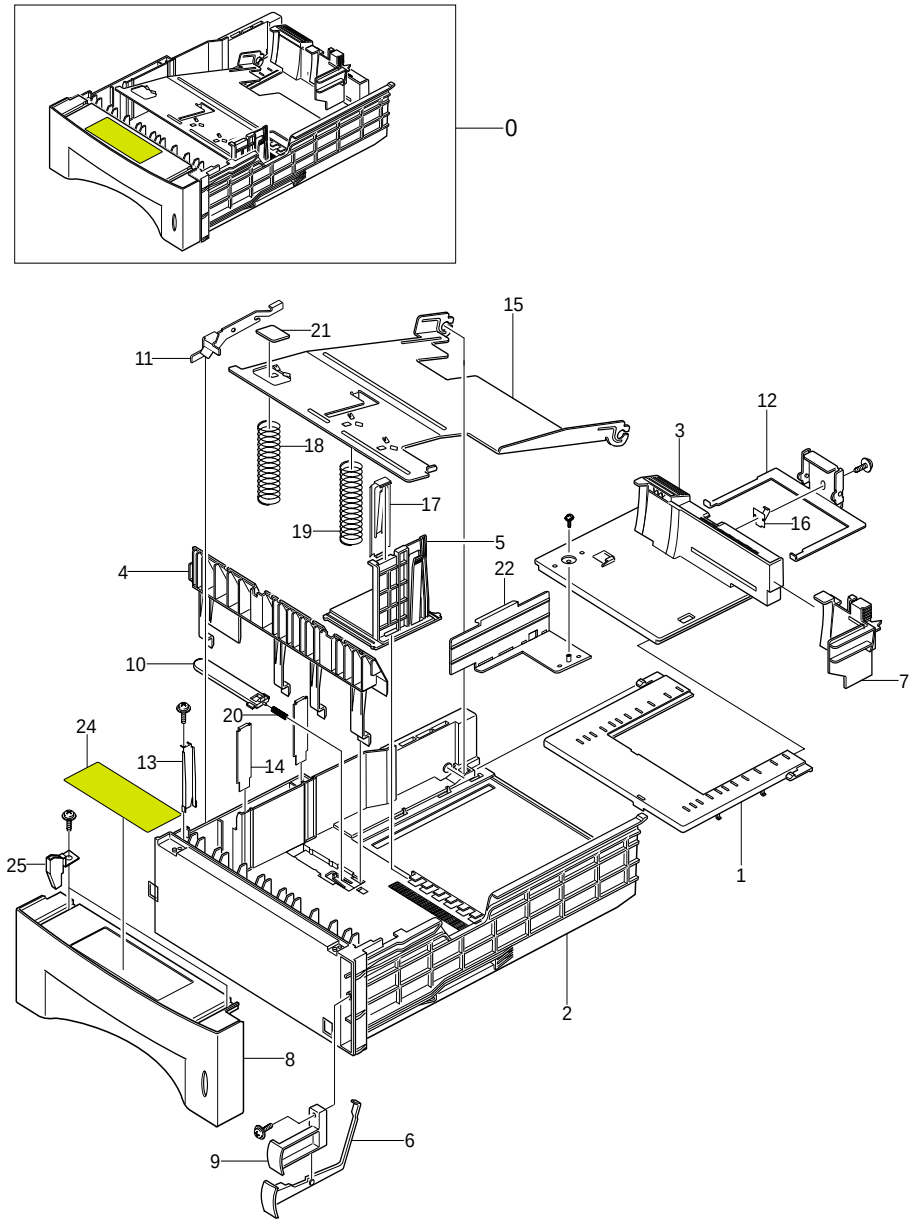
5-2-7 Pick-Up Exploded View

NO.	DESCRIPTION	Q'TY
0	MEA UNIT-FEEDER	1
1	SCREW-TAPTITE	1
2	WASHER-PLAIN	4
3	SPRING-FEED(1)	1
4	SPRING-FEED(2)	1
5	BEARING-PICK UP	4
6	GEAR-P/UP DRIVE	1
7	GEAR-FEED	1
8	GEAR-PICK UP(12)	1
9	IPR-SHAFT FEED	1
10	IPR-SHAFT FEED IDLER	3
11	IPR-SHAFT PICK UP	1
12	GROUND_FEED	1
13	IPR-GUIDE_FEED, 16	1
14	PMO-HOUSING P/UP	1
15	PMO-ROLLER FEED L	2
16	PMO-ROLLER FEED S	1
17	PMO-SUB HOLDER FEED	1
18	PMO-FRAME_FEED	1
19	PMO-HOLDER FEED(1)	1
20	PMO-HOLDER FEED(2)	1
21	PMO-IDLE PICK_UP	1
22	PMO-ROLL_FEED, DRV 12	1
23	RMO-RUBBER PICK_UP	1
24	RMO-LEVER PICK_UP	1
25	SPRING PICK UP(12)	1
26	RING-CS	1



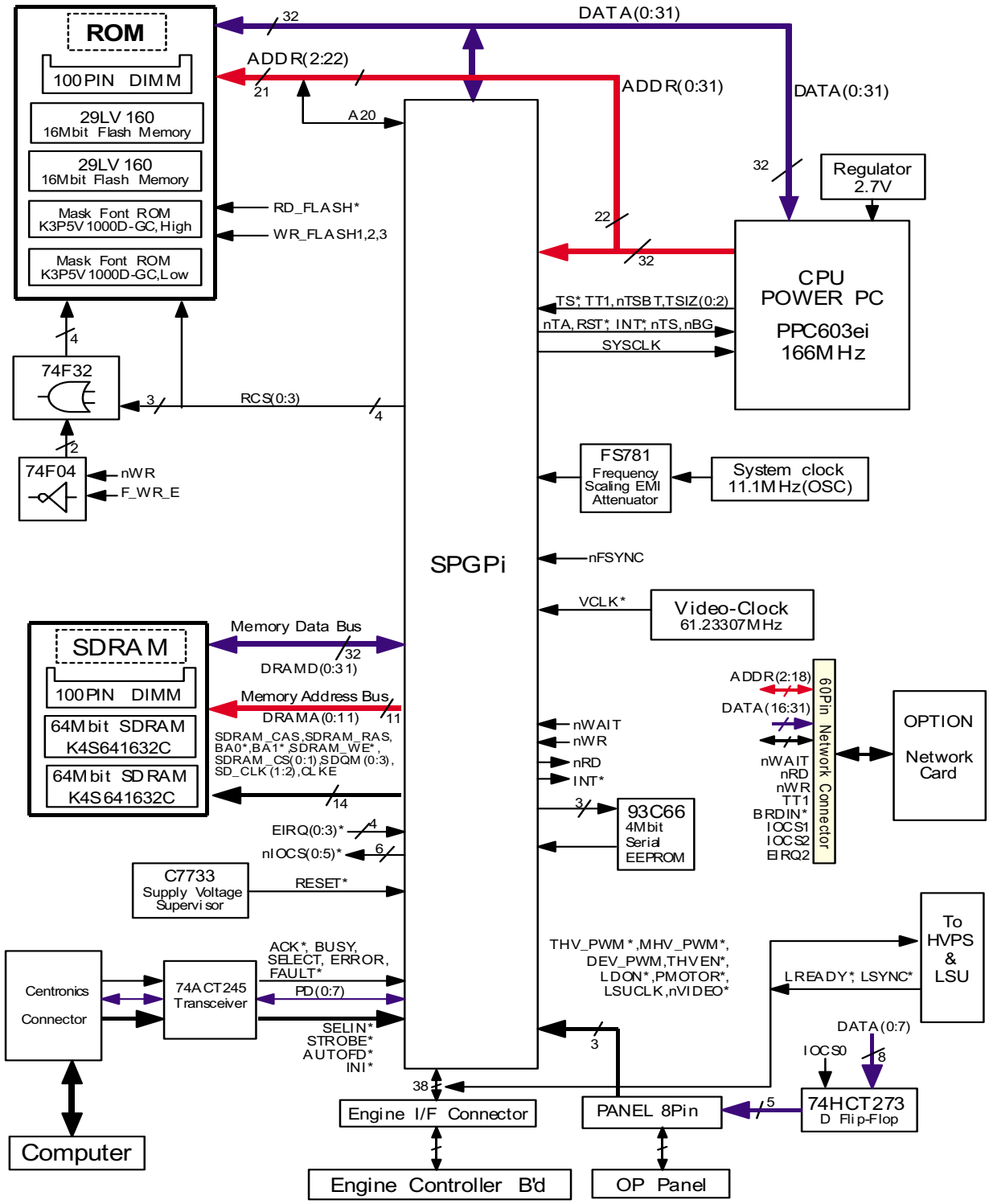
5-2-8 Cassette Exploded View

NO.	DESCRIPTION	Q'TY
0	MEA UNIT FEEDER CST (500)	1
1	PMO-COVER GUIDE EXT	1
2	PMO-FRAME CASSETTE	1
3	PMO-GUIDE EXT CST	1
4	PMO-GUIDE PAPER	1
5	PMO-GUIDE SIDE CST	1
6	PMO-INDICATOR EMPTY	1
7	PMO-SIDE GUIDE EXT	1
8	PMO-SUB GUIDE CAST	1
9	PMO-HOLDER_INDICATOR	1
10	PMO-LOCKER PLATE	1
11	IPR-FINGER	1
12	IPR-GUIDE EXT LOCK	1
13	IPR-GUIDE PAPER SCF	1
14	IPR-GUIDE PLT PAPER	2
15	IPR-PLATE KNOCK UP	1
16	IPR-PLATE SPR LOCK	1
17	IPR-SPR PLT G/SIDE	1
18	SPRING PLATE K/UP 1	1
19	SPRING PLATE K/UP 2	1
20	SPRING LOCKER,PLATE	1
21	RPR-PAD CST	1
22	PMO GUIDE PAPER SIZE	1
23	SCREW TAPTITE M3 x 10 NI	7
24	LABEL(R)-CASSETTE	1
25	GUIDE PAPER DUMMY	1

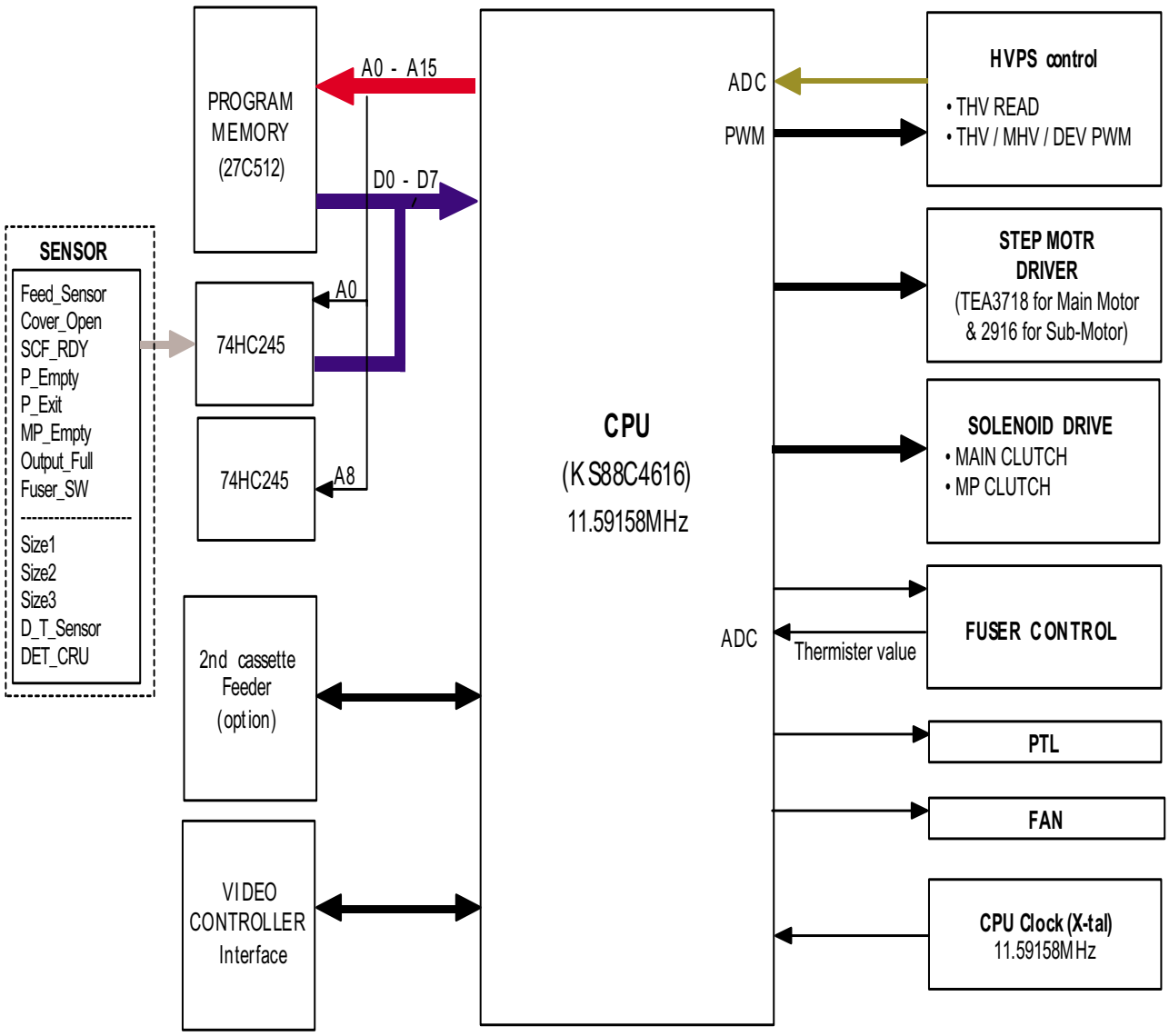


6. Block Diagram

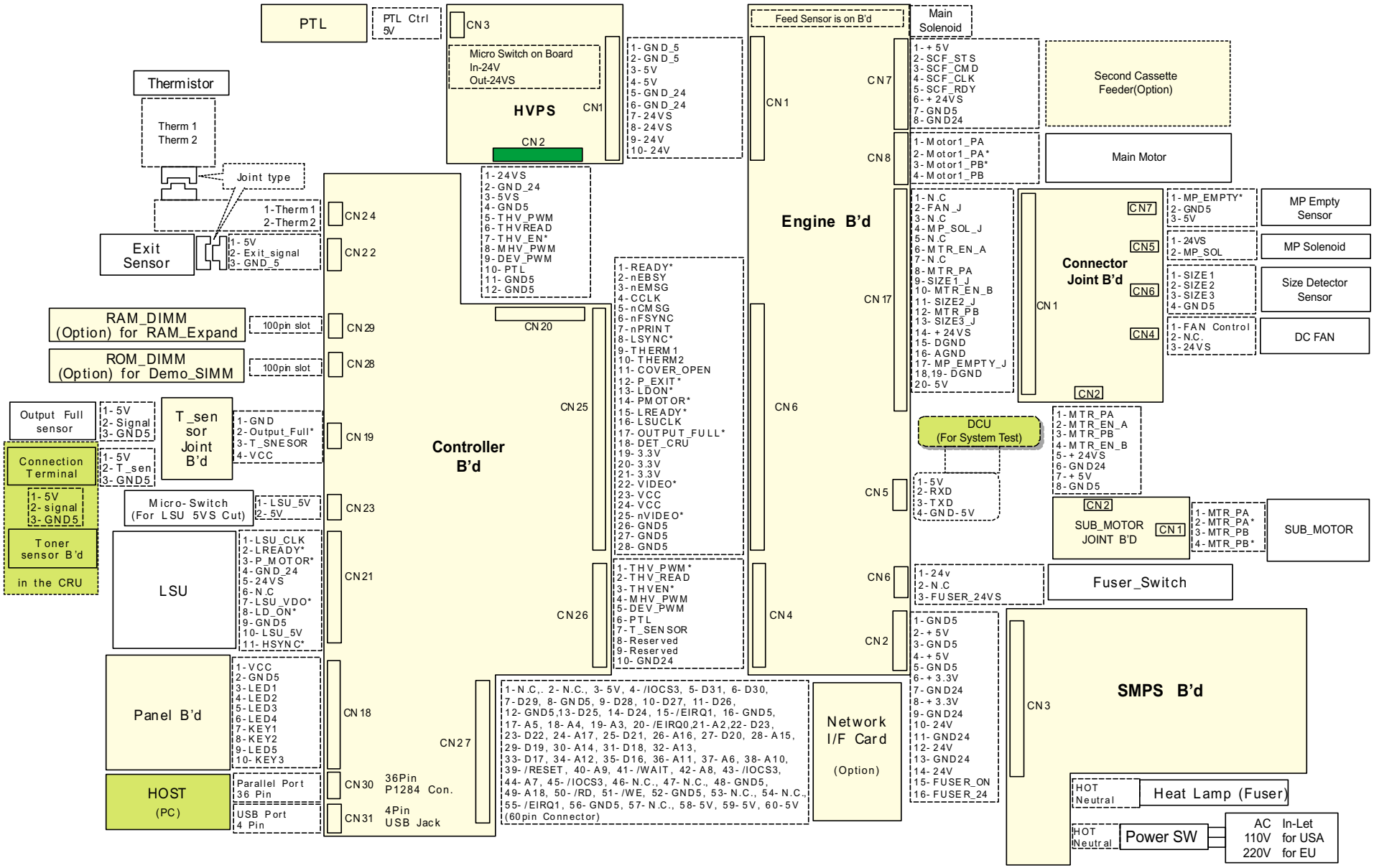
6-1 Video ControllerBlock Diagram



6-2 Engine Block Diagram

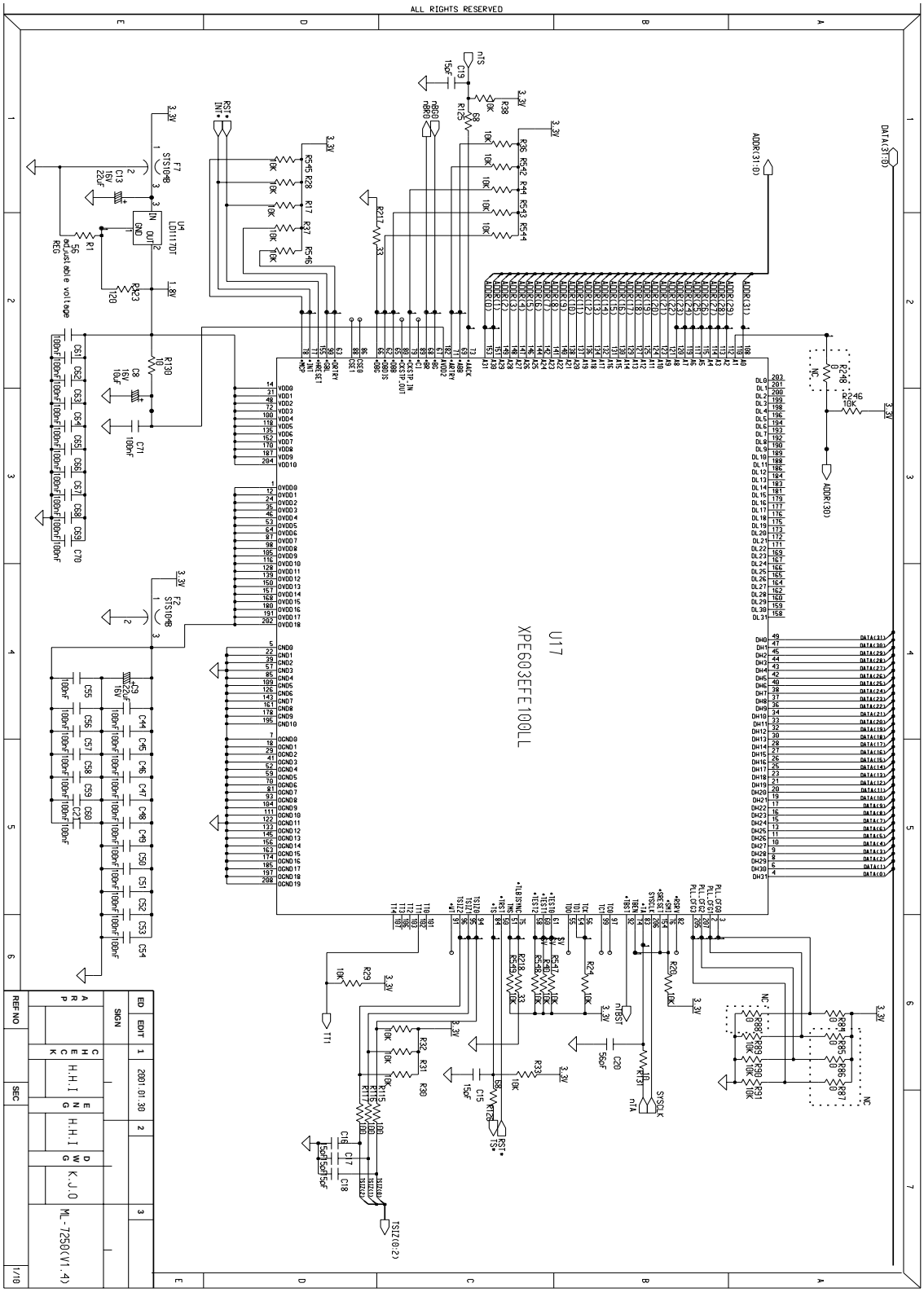


7. Connection Diagram



9. Schematic Diagrams

9-1 Main Circuit Diagram(1/10)



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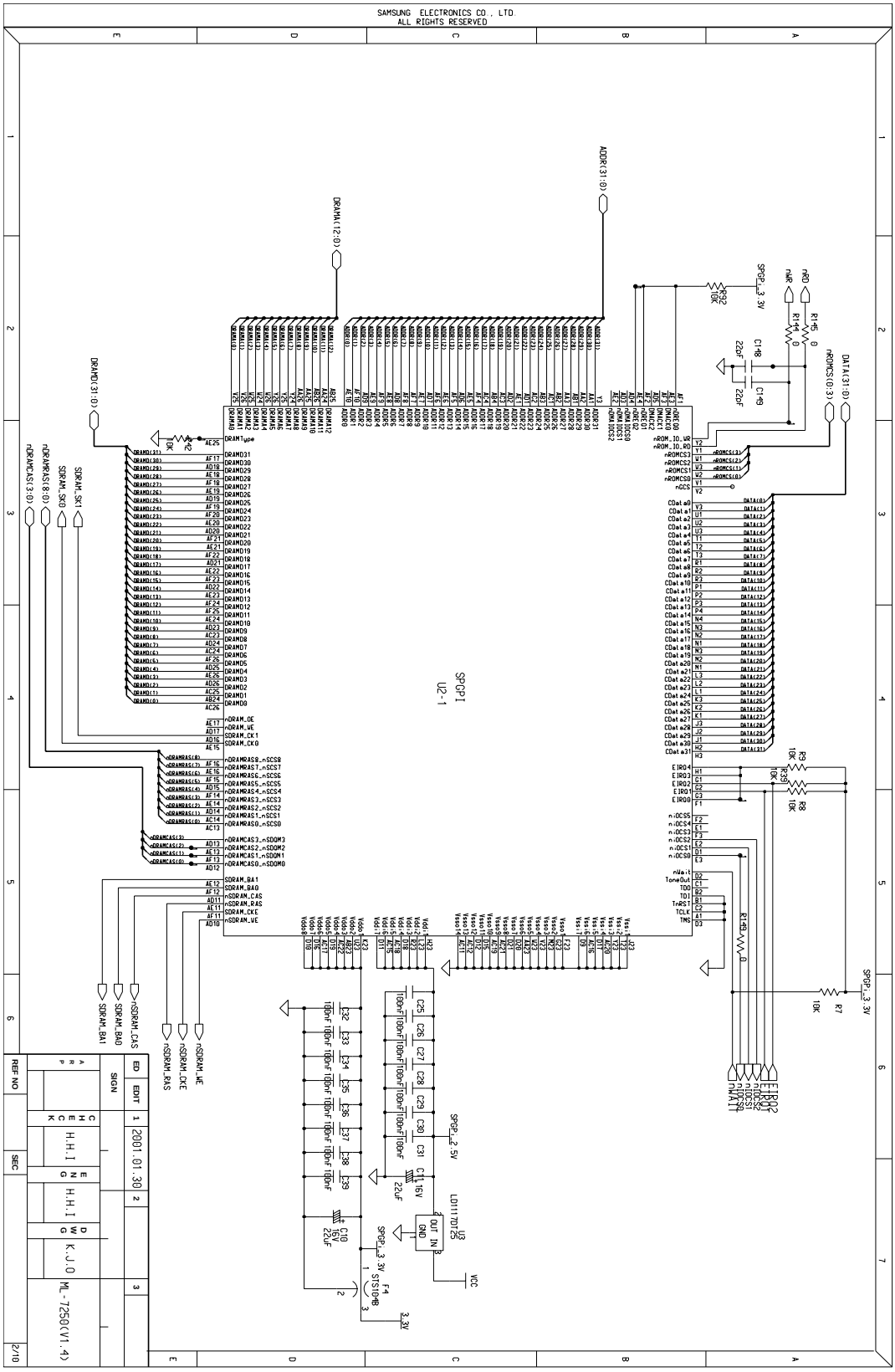
Main Circuit Diagram(2/10)



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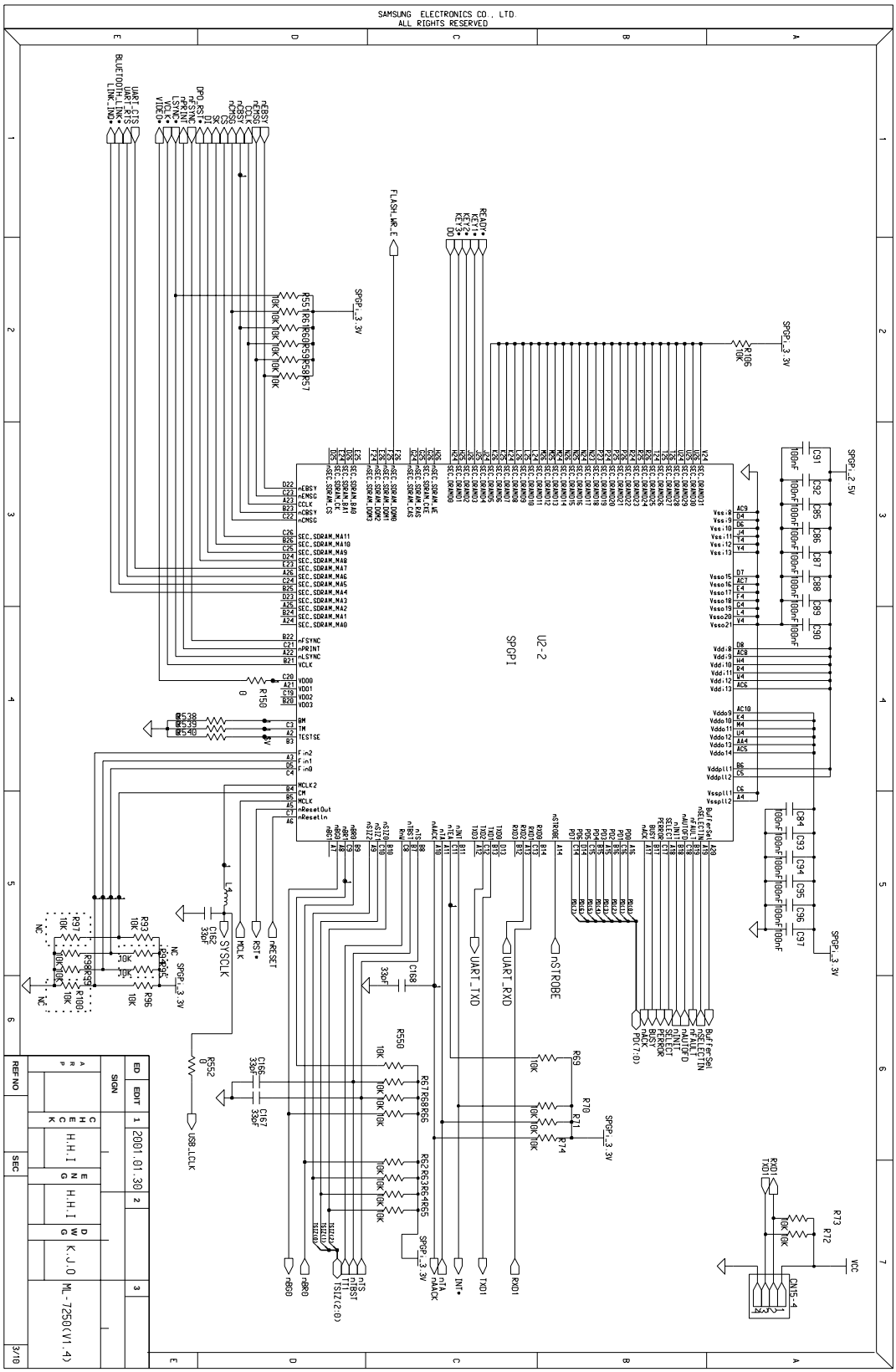
Main Circuit Diagram(3/10)



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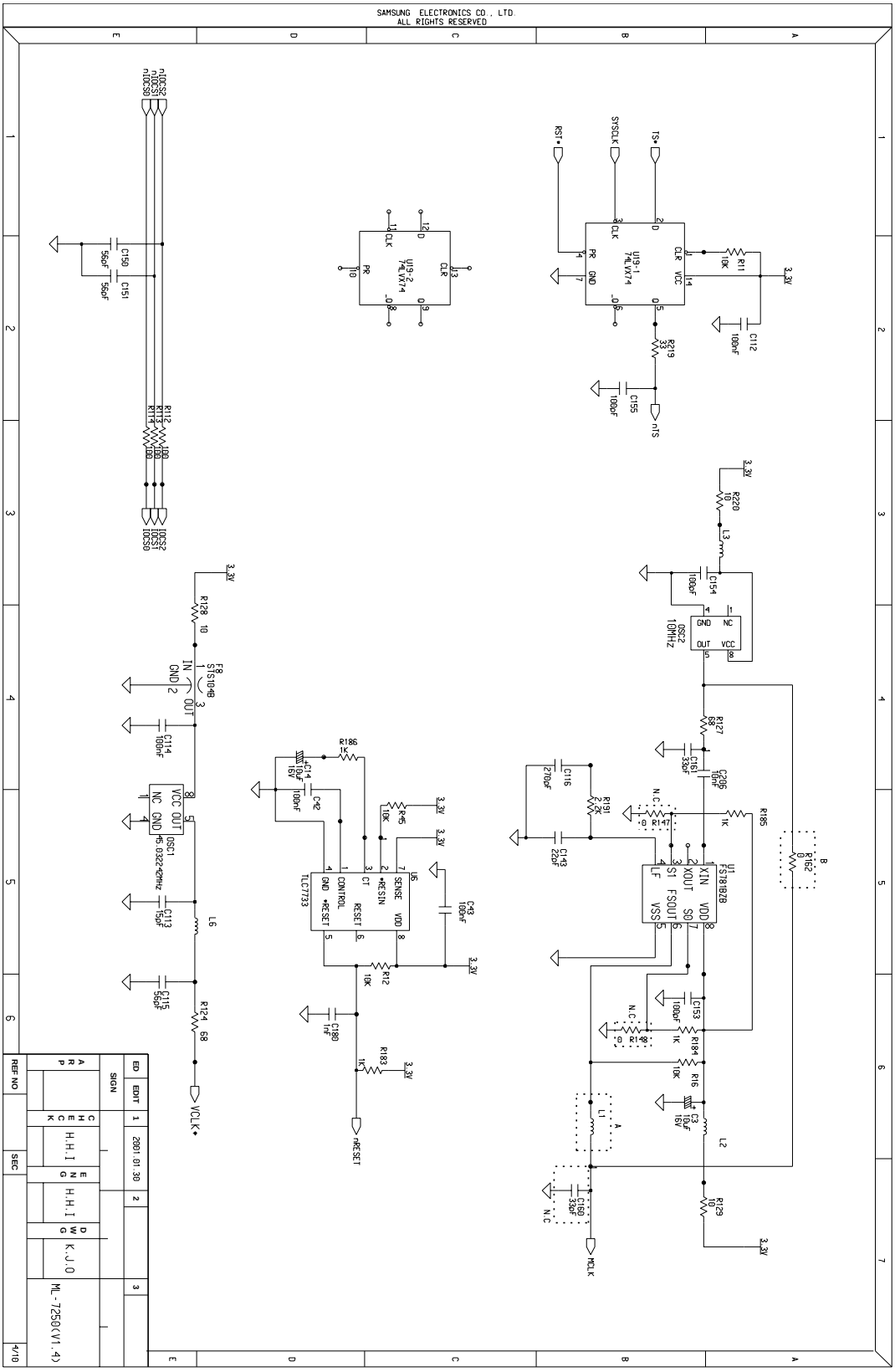
Main Circuit Diagram(4/10)



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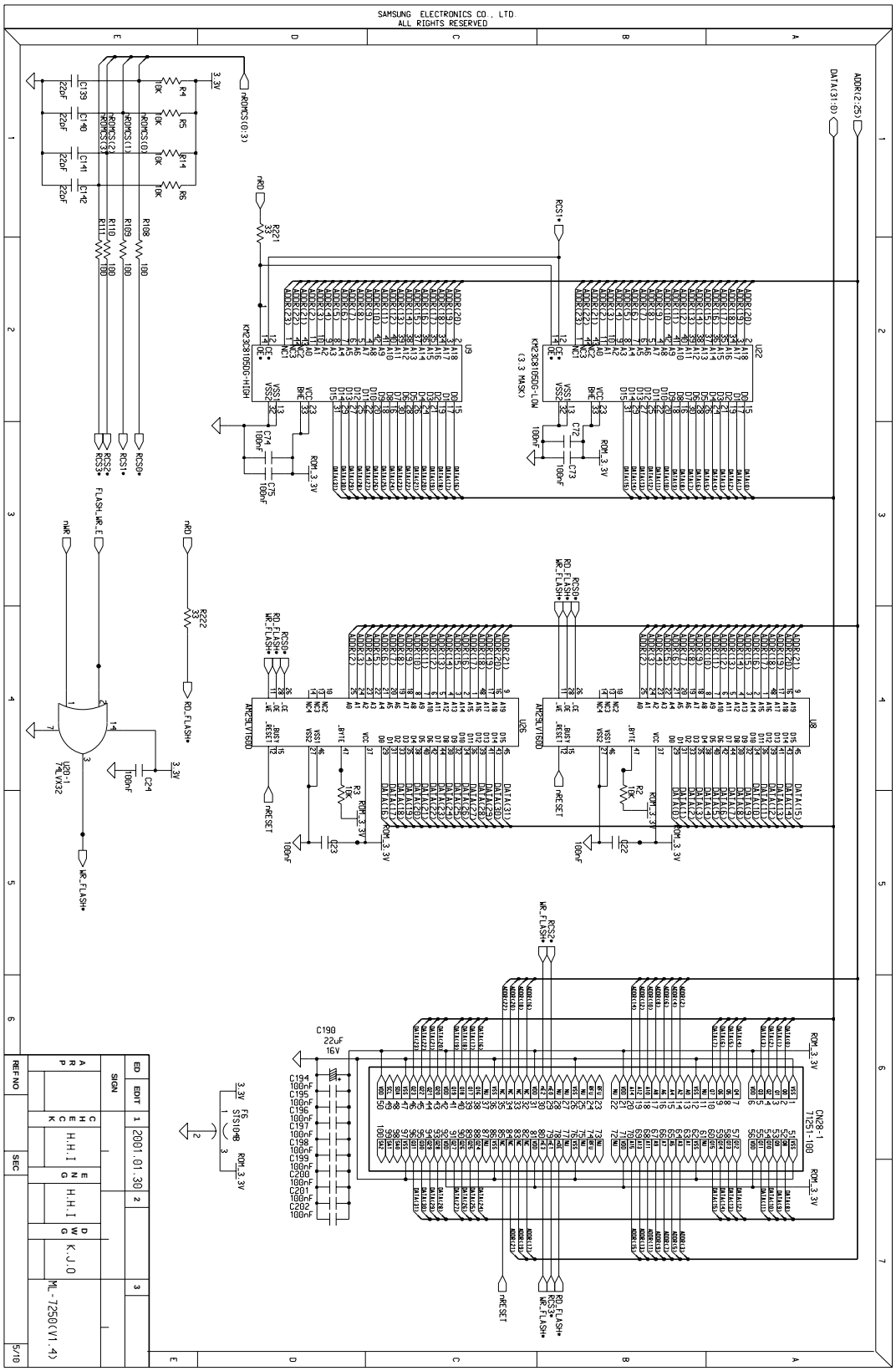
Main Circuit Diagram(5/10)



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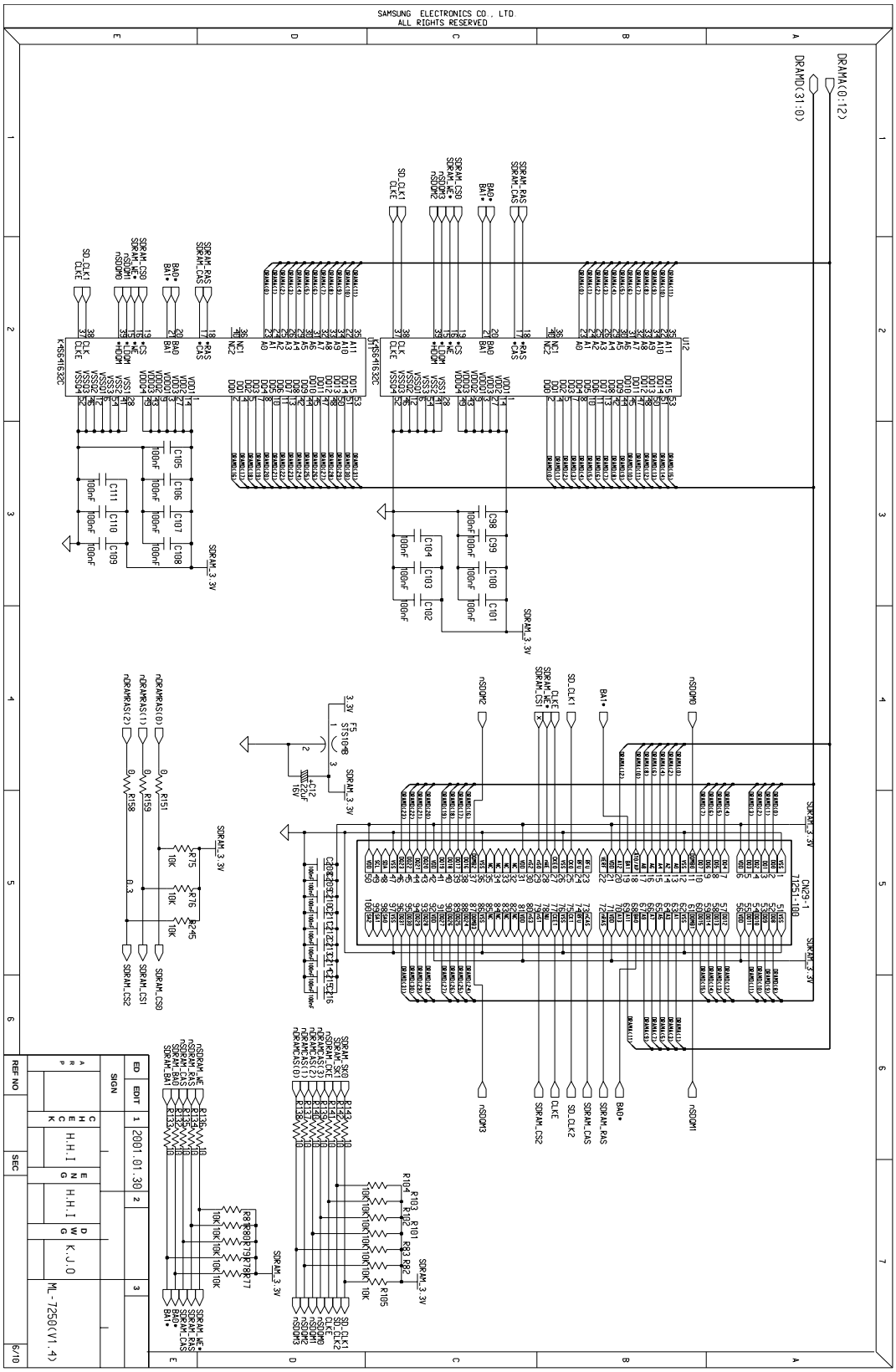
Main Circuit Diagram(6/10)



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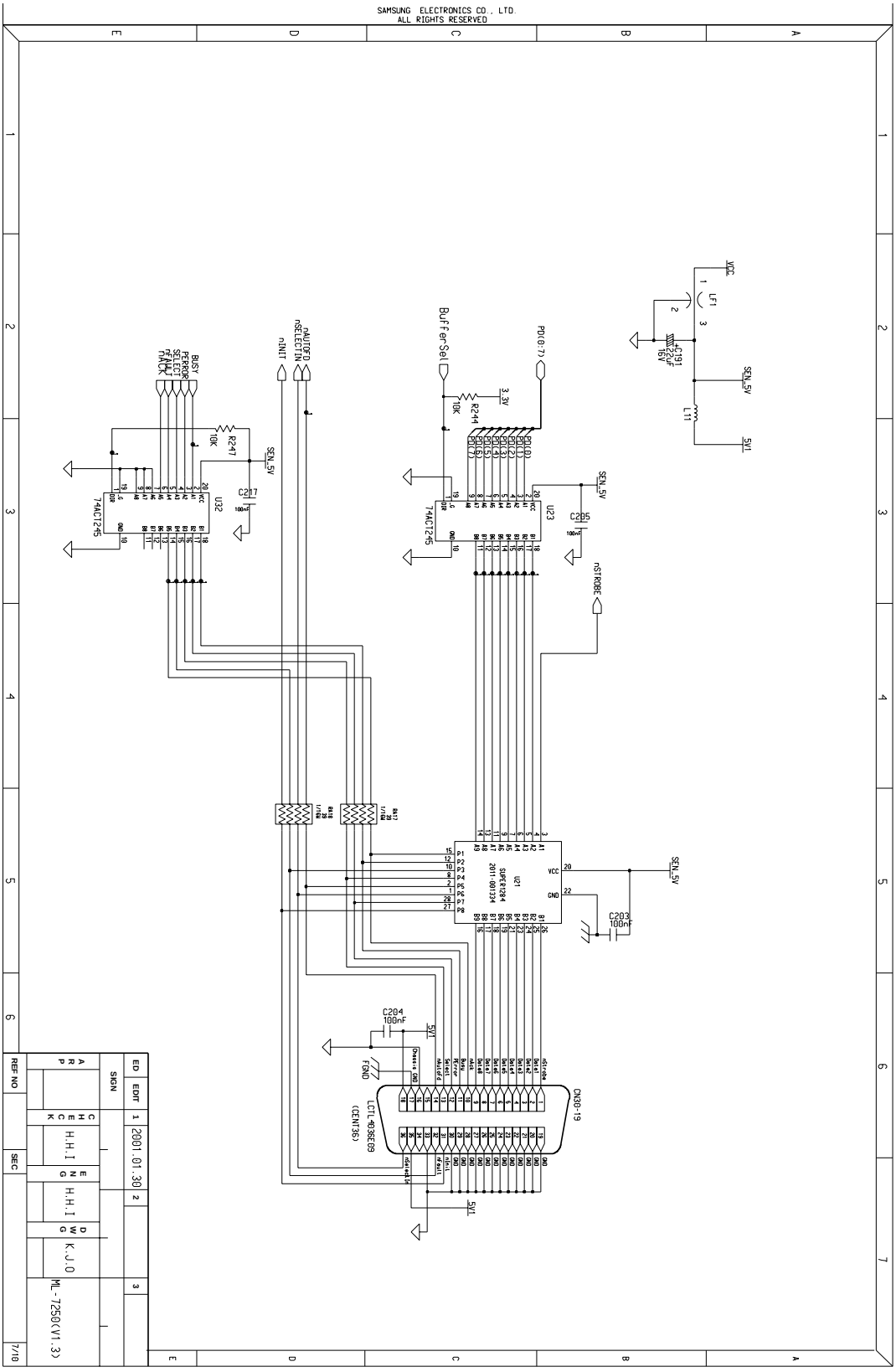
Main Circuit Diagram(7/10)



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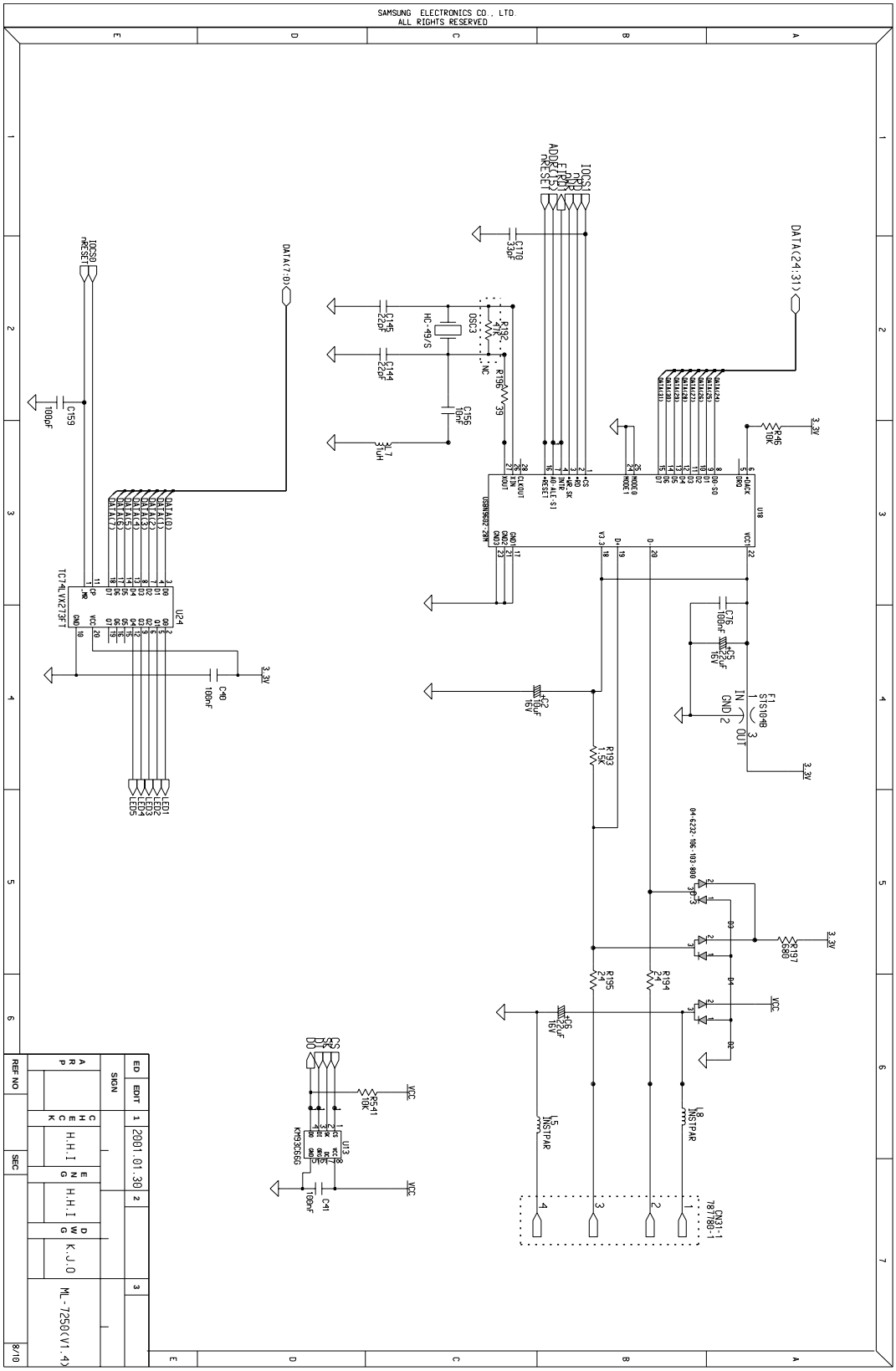
Main Circuit Diagram(8/10)



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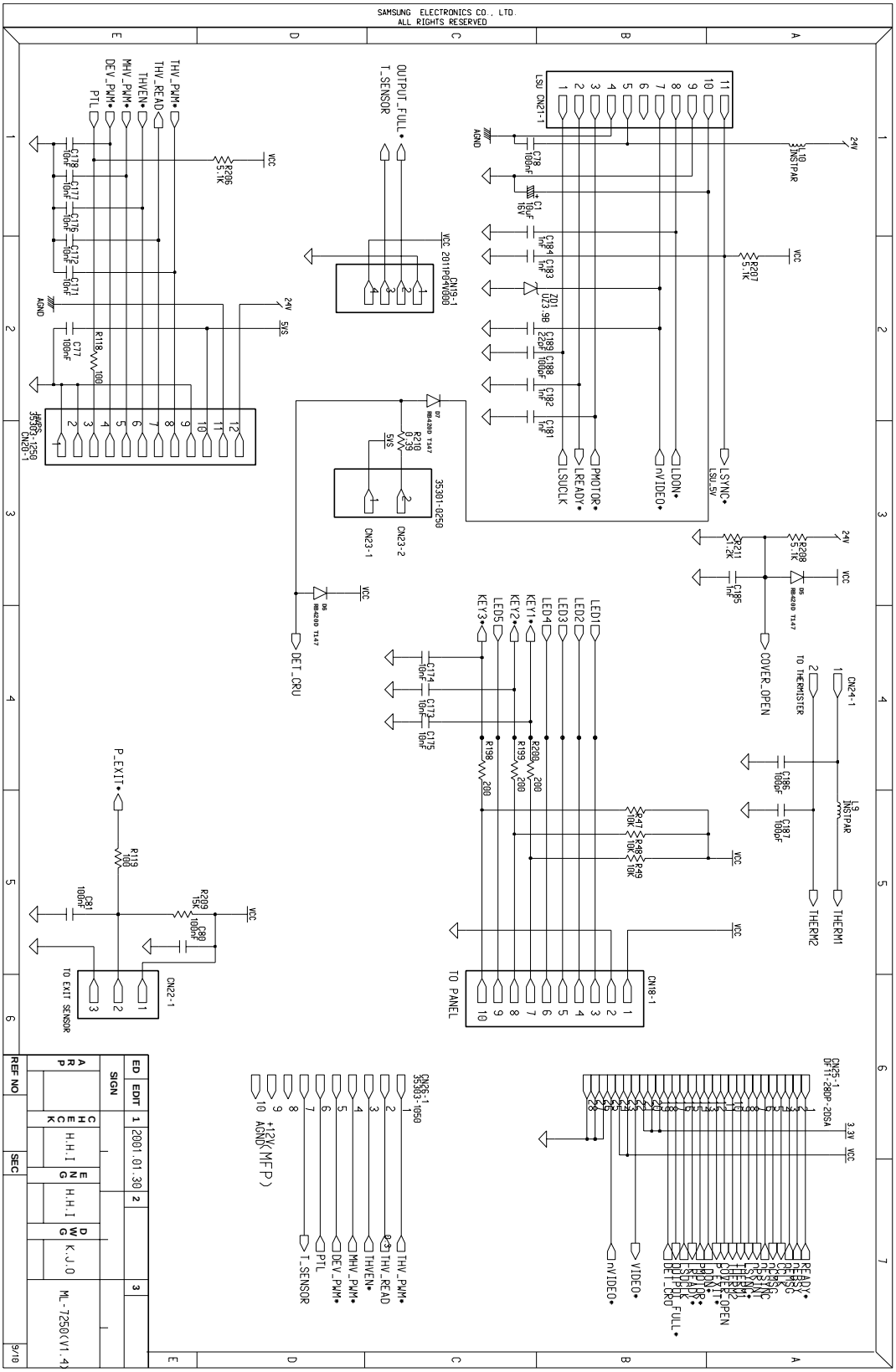
Main Circuit Diagram(9/10)



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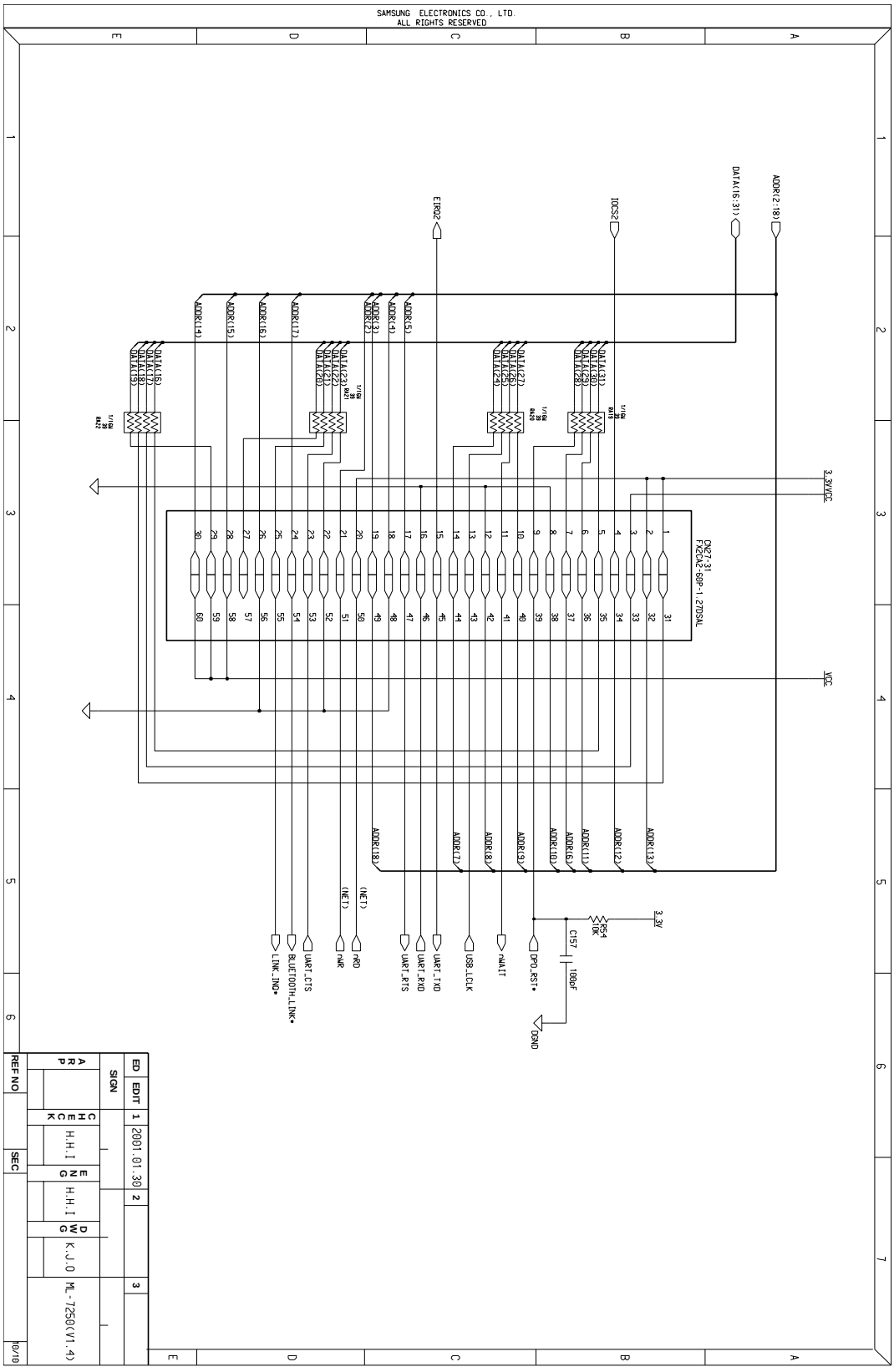
Main Circuit Diagram(10/10)



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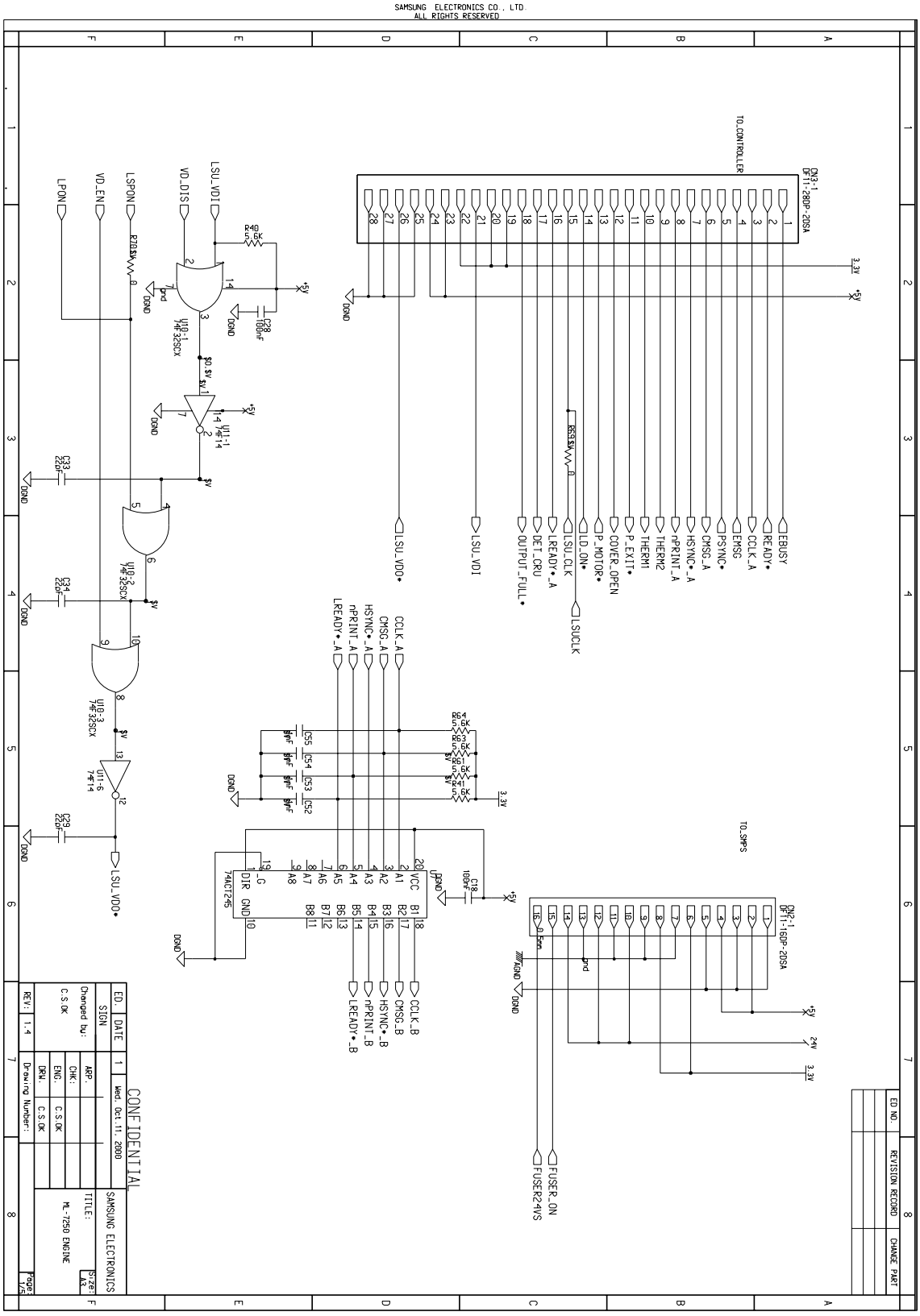
9-2 Engine Circuit Diagram(1/5)



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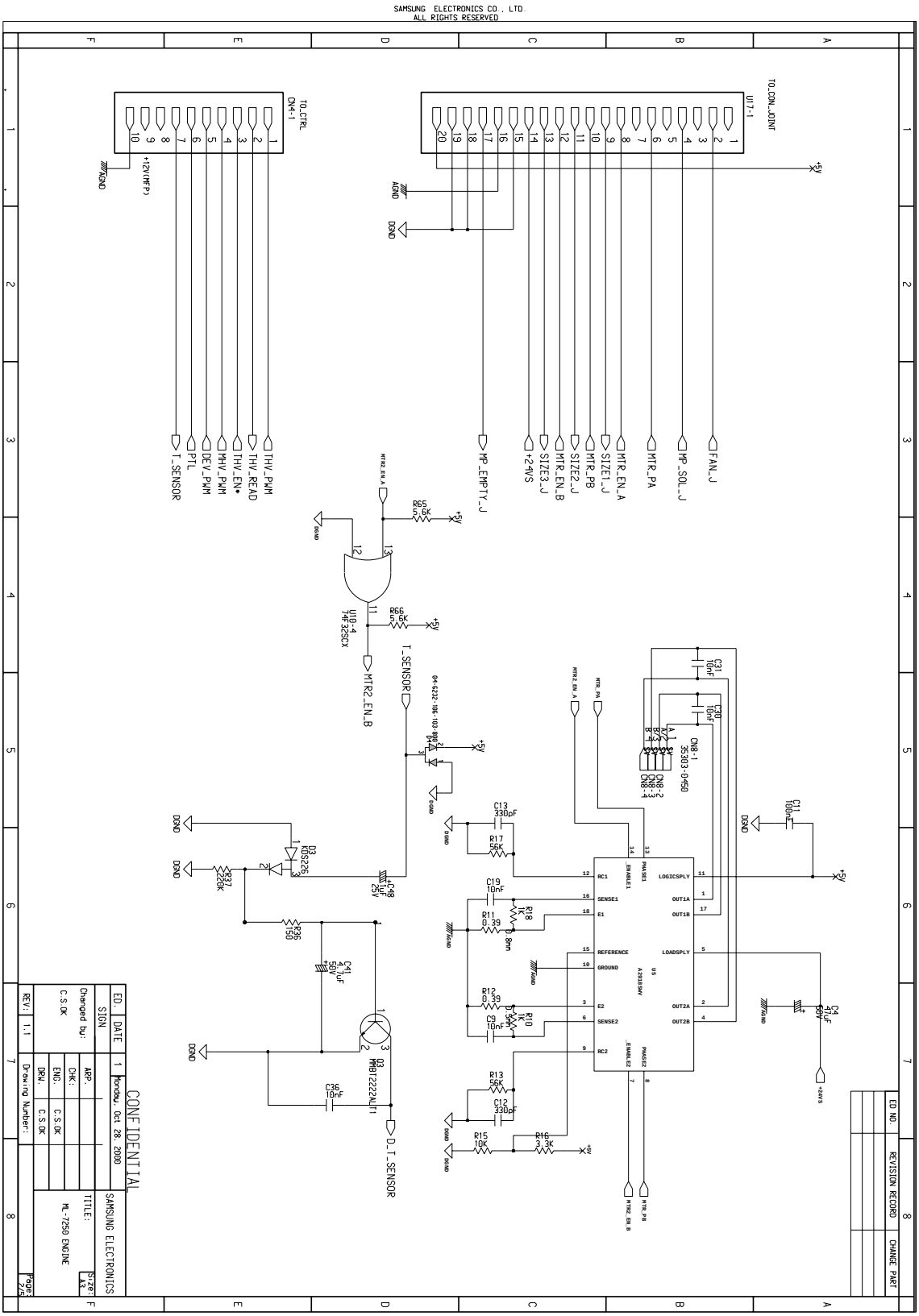
Engine Circuit Diagram(2/5)



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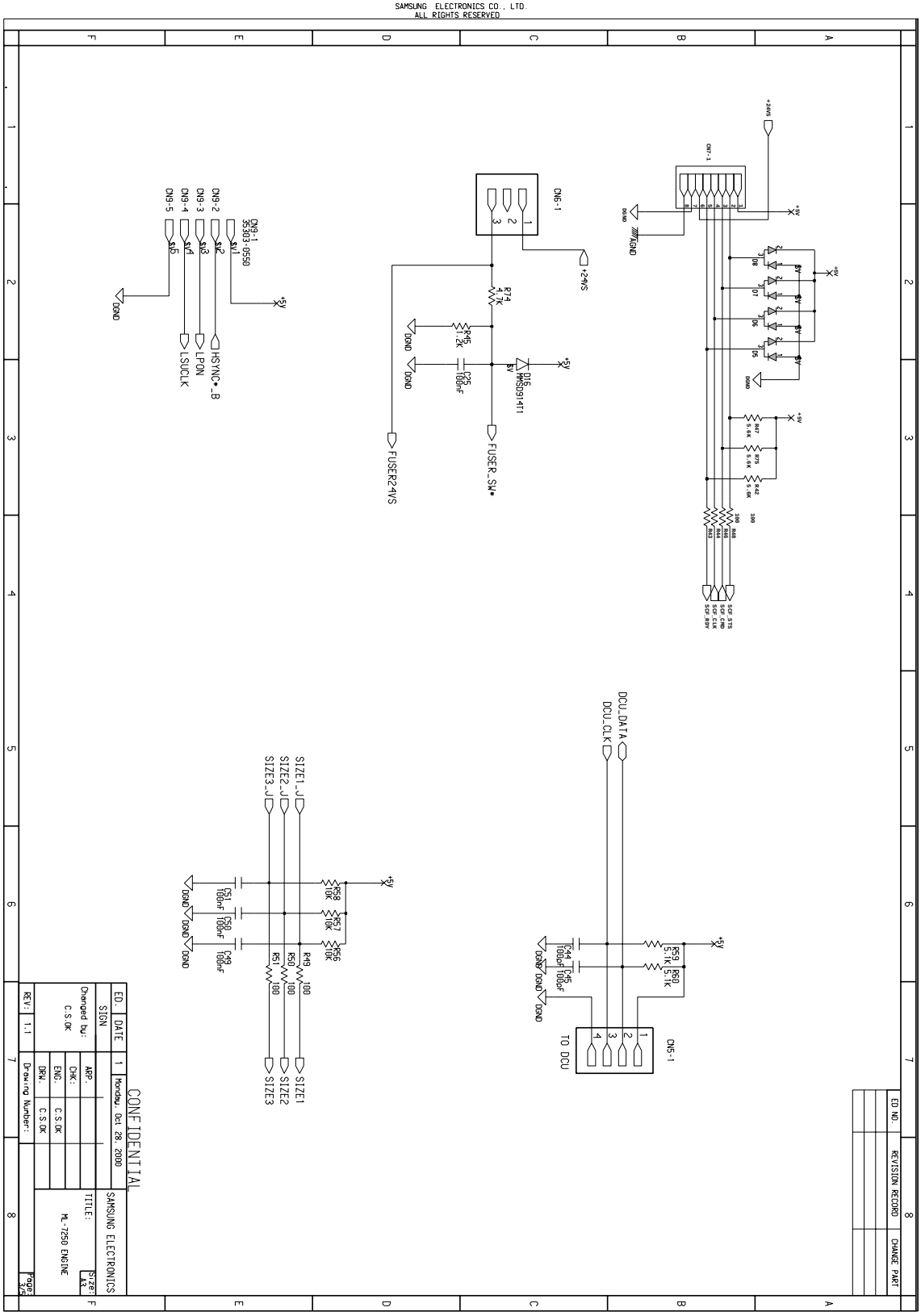
Engine Circuit Diagram(3/5)



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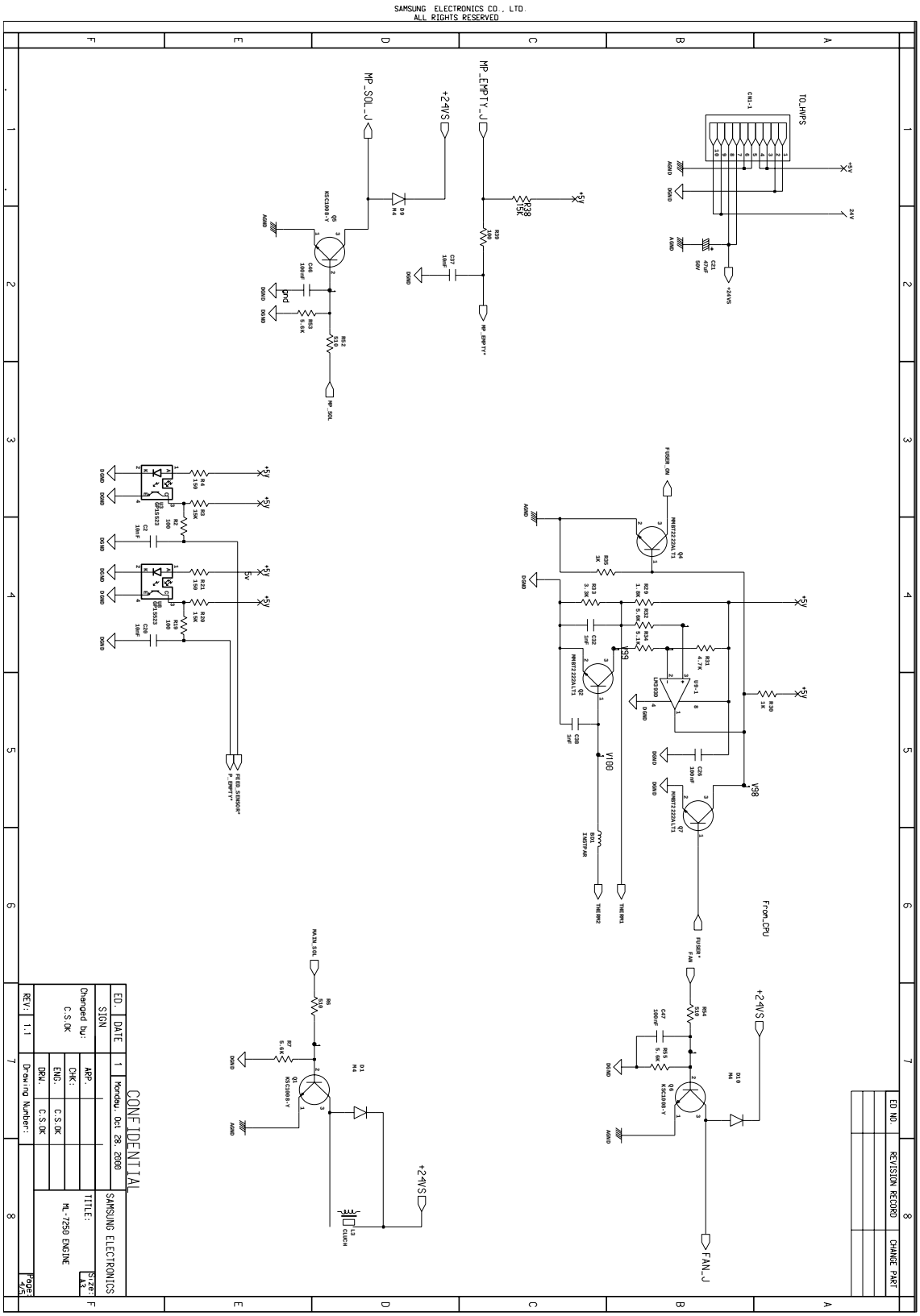
Engine Circuit Diagram(4/5)



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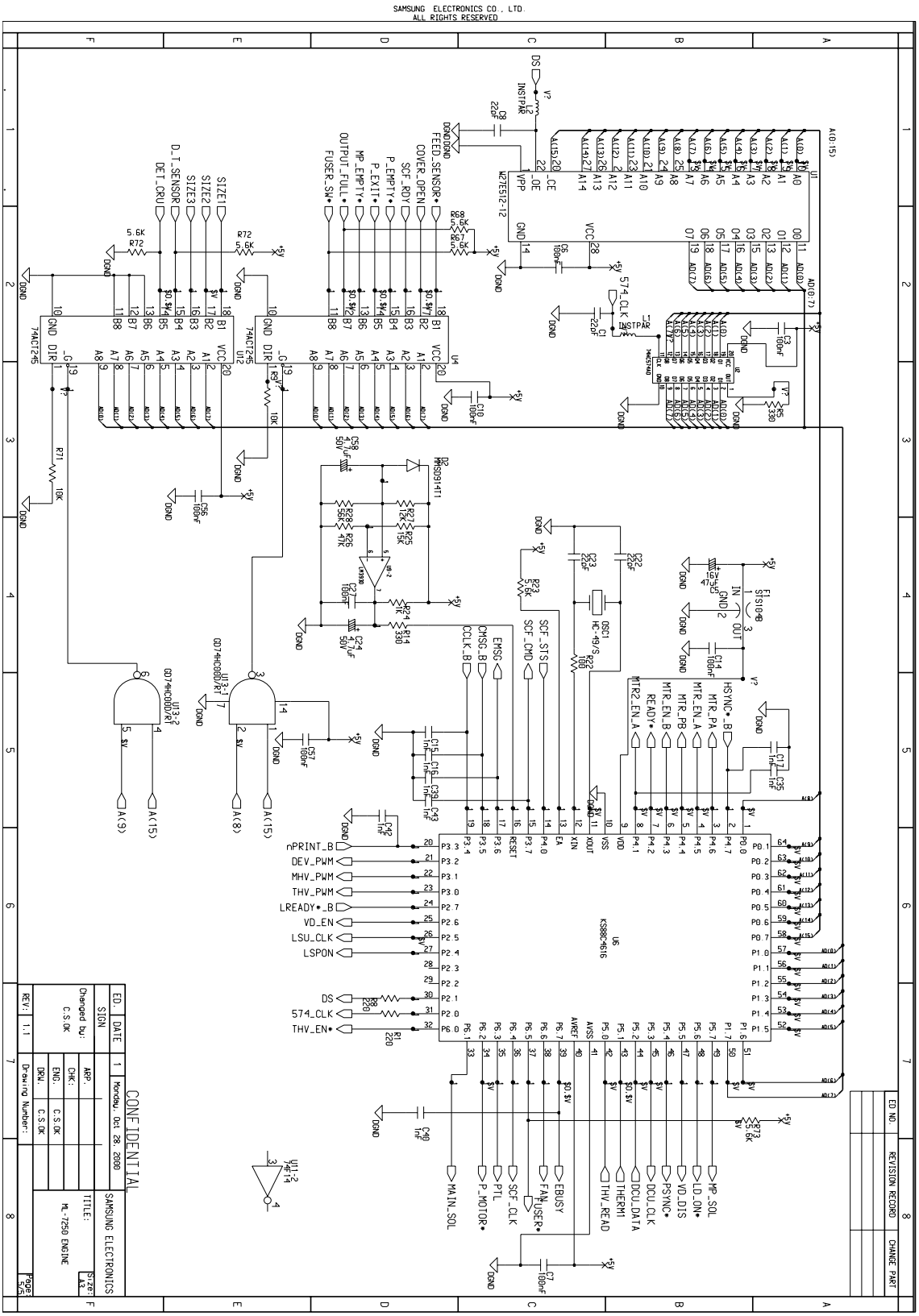
Engine Circuit Diagram(5/5)



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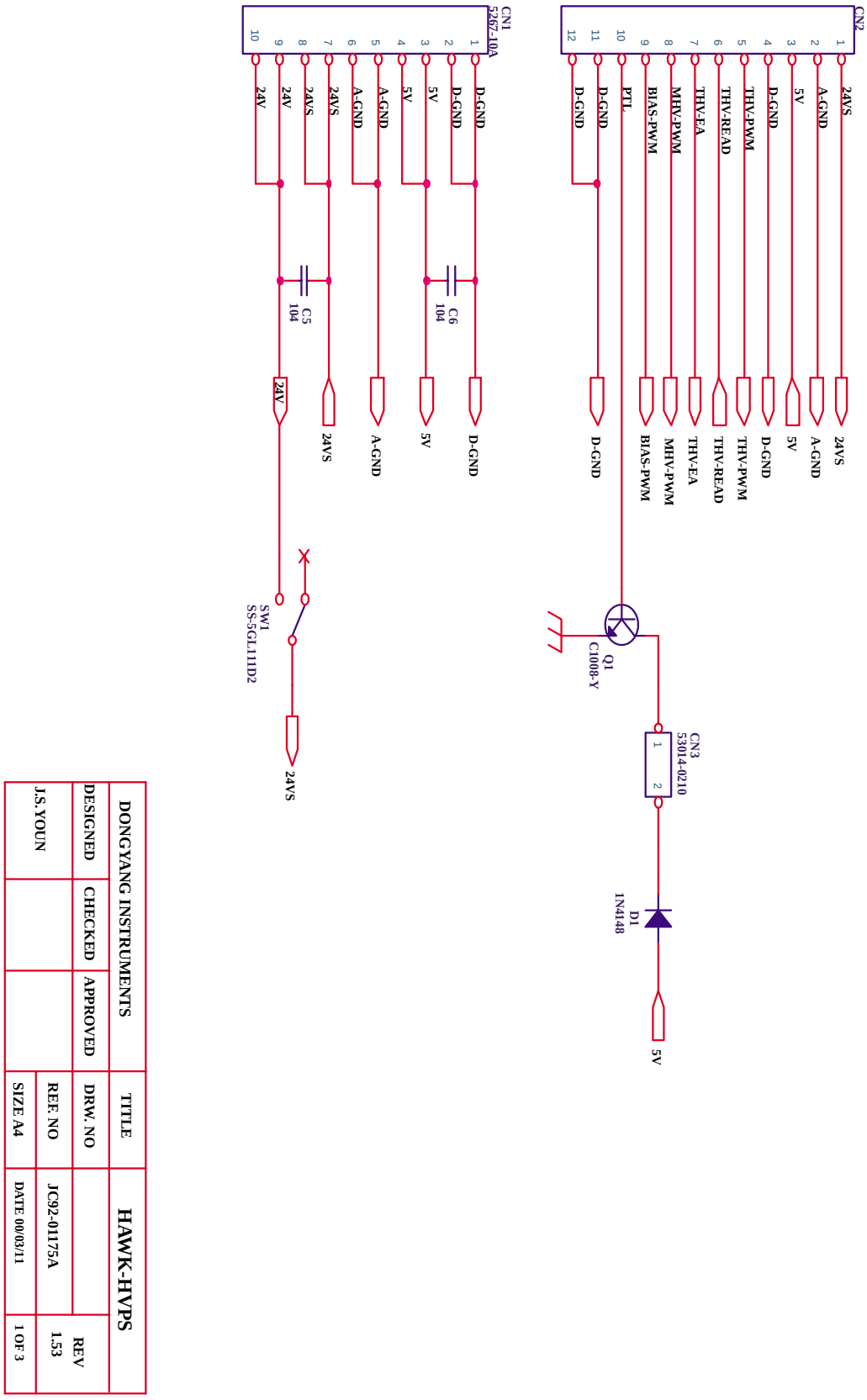
9-3 HVPS Circuit Diagram(1/3)



DONGYANG INSTRUMENTS			TITLE	HAWK-HVPS
DESIGNED	CHECKED	APPROVED	DRW. NO	REV 1.53
J.S.YOUN			REF. NO	JC92-01175A
			DATE 00/03/11	1 OF 3
			SIZE A4	

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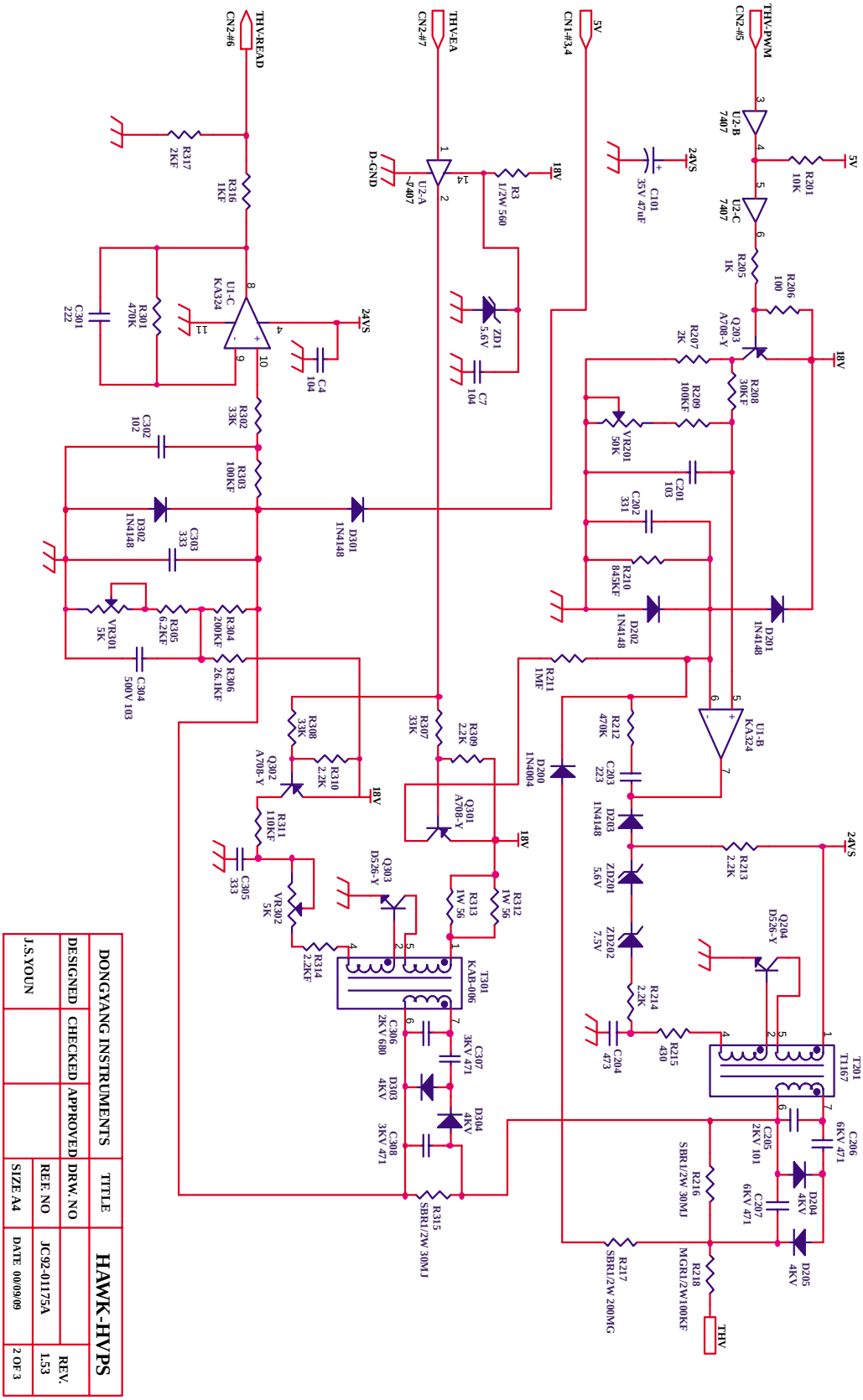
HVPS Circuit Diagram(2/3)



DONGYANG INSTRUMENTS	TITLE	HAWK-HVPS
DESIGNED	DRW. NO	
CHECKED	REE. NO	JC92-01175A
APPROVED	SIZE A4	DATE 00/09/09
J.S.YOUN	REV.	1.53
	2 OF 3	

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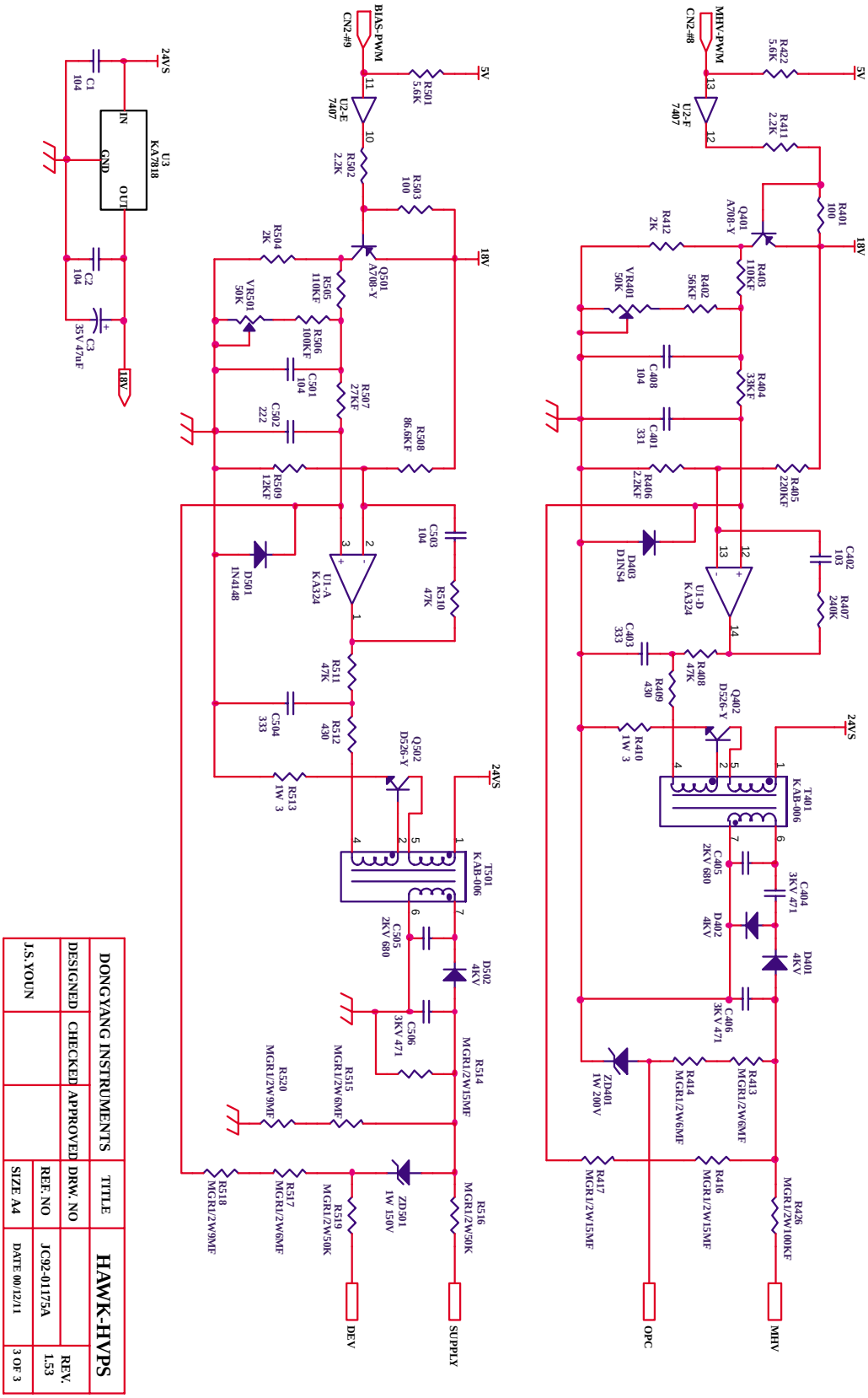
HVPS Circuit Diagram(3/3)



DONGYANG INSTRUMENTS		TITLE	HAWK-HVPS
DESIGNED	CHECKED	APPROVED	DRW. NO	REV.
J.S.YOUN			JC92-01175A	1.53
SIZE A4	DATE 00/12/11		3 OF 3	

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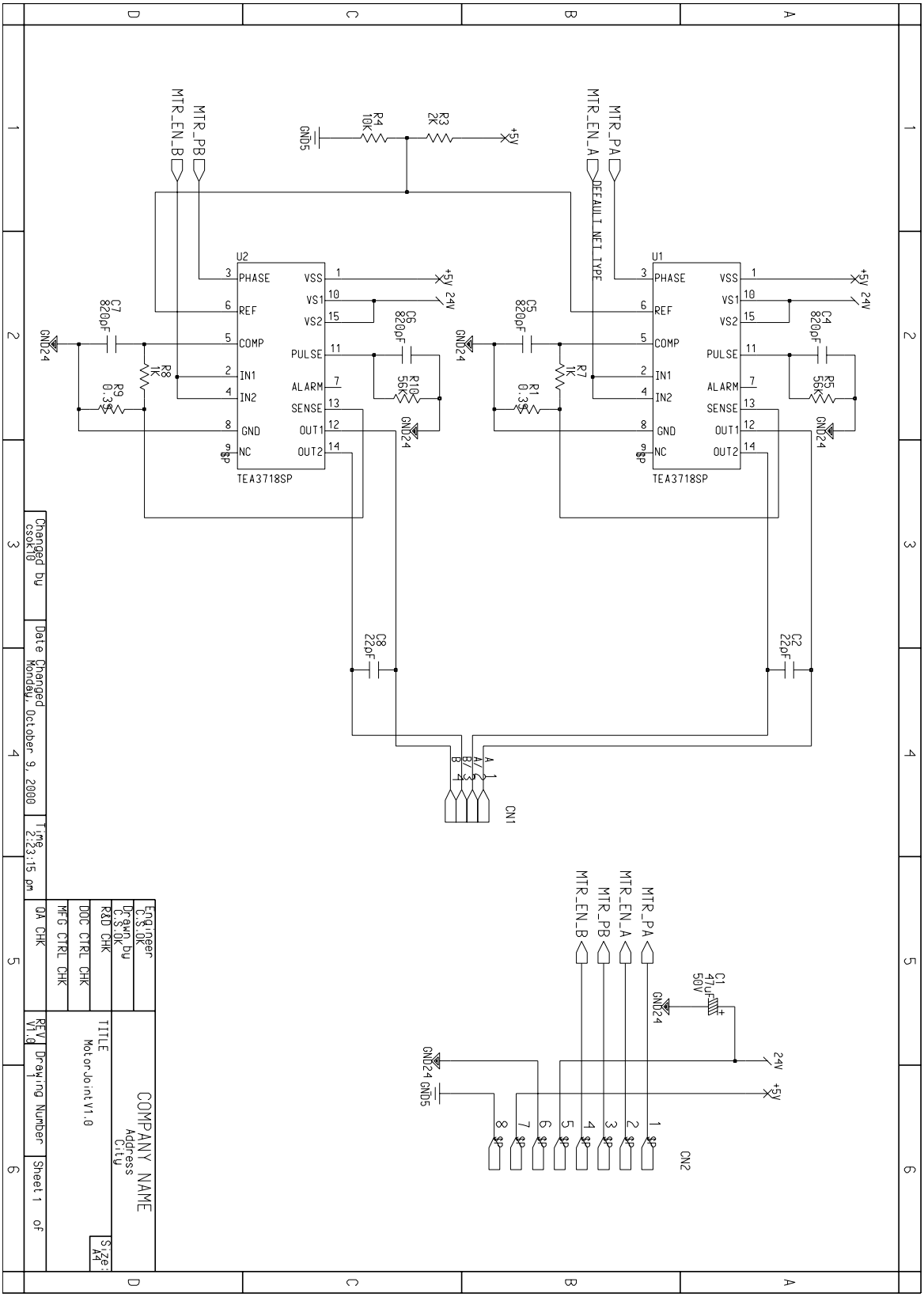
9-4 Motor Circuit Diagram



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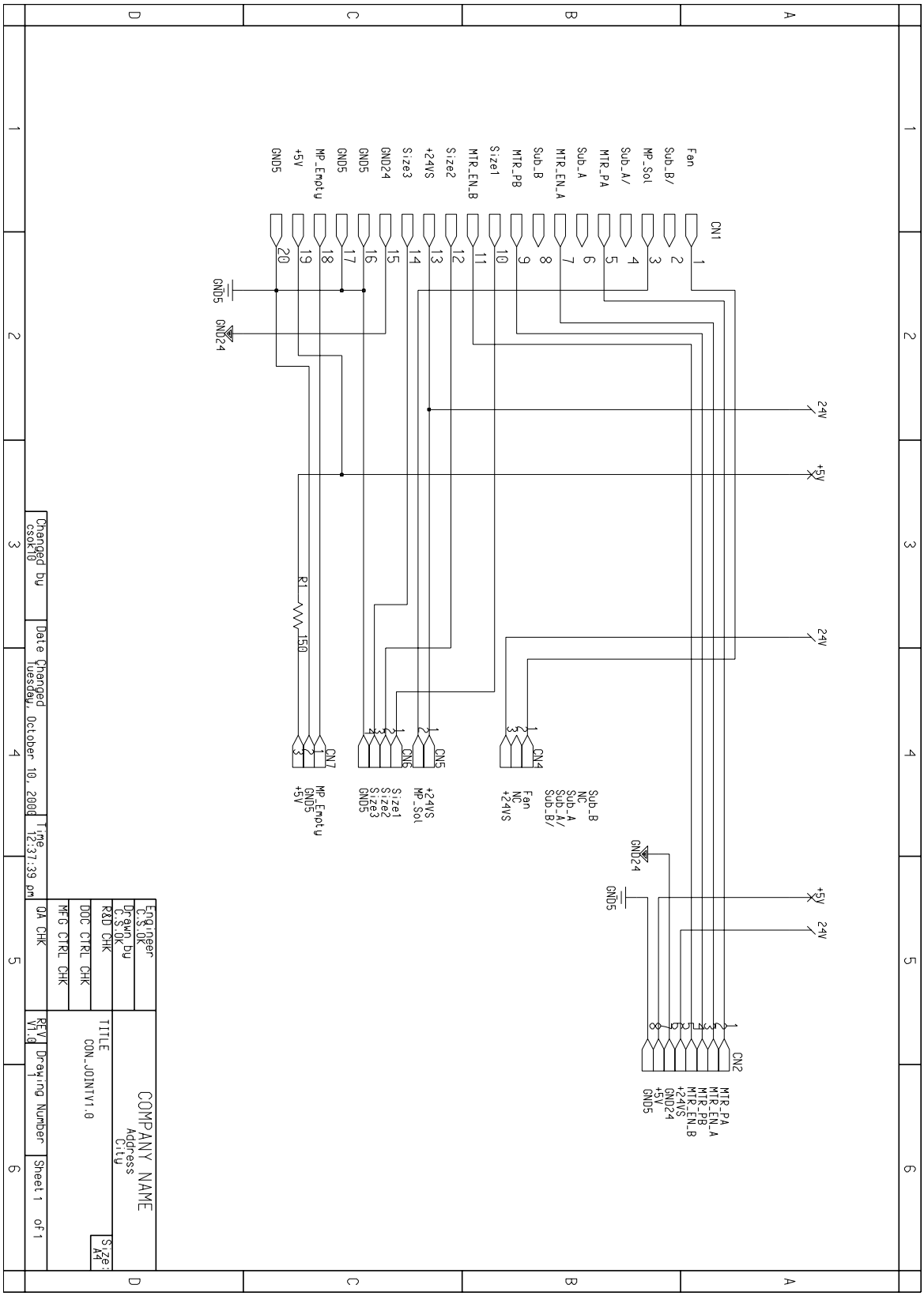
9-5 Jointr Circuit Diagram



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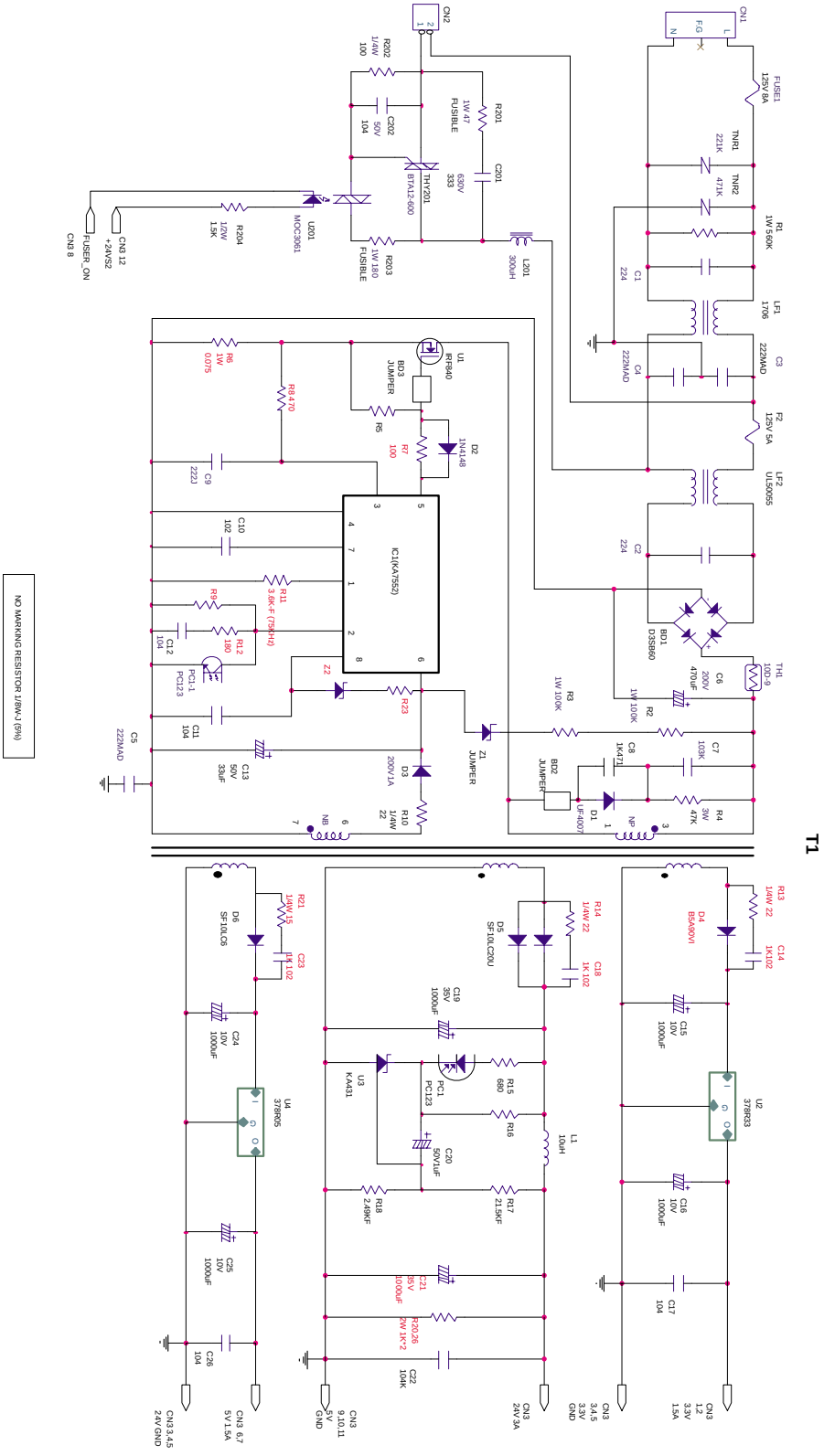
9-6 SMPS Circuit Diagram(110V)



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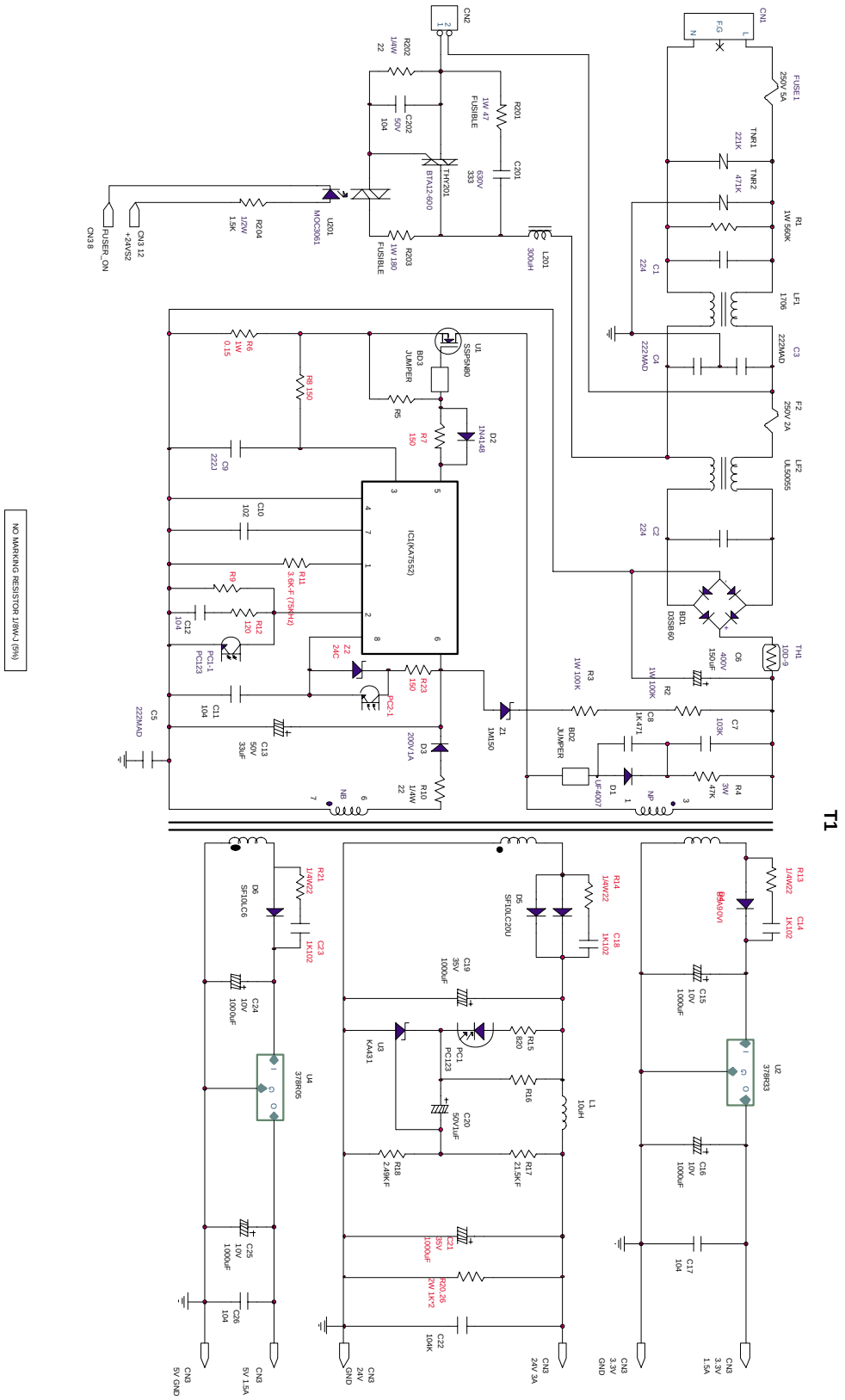
SMPS Circuit Diagram(220V)



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